

FM 23-55

DEPARTMENT OF THE ARMY FIELD MANUAL

**BROWNING
MACHINEGUNS
CALIBER .30
M1919A6 AND M37**



HEADQUARTERS, DEPARTMENT OF THE ARMY

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FIELD MANUAL

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BROWNING MACHINEGUNS, CALIBER .30 M1919A6 AND M37

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* This manual supersedes FM 23-55, 16 October 1955.

CHAPTER 1 INTRODUCTION

Section I. GENERAL

1. Purpose and Scope

a. This manual is a guide for training on the Browning machinegun caliber .30. Instructors will find that this manual, together with the appropriate Army (MOS) Subject Schedule, Army Training Program 7-18, and Field Manual 23-87, provides a sound and detailed basis for training with this weapon. This manual and the referenced publications provide for the utilization of concurrent training stations in presenting subjects and recommend those subjects which should be taught concurrently. Range facilities, time allocations, and concurrent training stations are based upon a 200-man unit. Units training substantially larger or smaller numbers of personnel should modify their training plans accordingly. Information is presented in a logical sequence from the basic to the more complex phases of instruction.

b. The material contained in this manual is applicable to both nuclear and nonnuclear warfare.

c. Users of this manual are encouraged to submit recommended changes or comments to improve the manual. Comments should be keyed to the specific page, paragraph, and line of the text in which the change is recommended. Reasons should be provided for each comment to insure understanding and complete evaluation. Comments should be forwarded direct to the Commandant, United States Army Infantry School, Fort Benning, Ga.

2. Roles of the Machinegun

The machinegun supports the rifleman in both the attack and the defense. It is capable of engaging distant targets with a heavy volume of controlled and accurate fire that is beyond the capabilities of individual weapons. It provides the rifleman with the heavy volume of close and continuous fire he needs to accomplish his mission in the attack. Moreover, the long-range, close defensive, and final protective fires delivered by this weapon form an integral part of a unit's defensive fires.

Section II. DESCRIPTIONS

3. Browning Machinegun, Caliber .30, M1919A6

a. *General.* The caliber .30 M1919A6 machinegun is an air-cooled, belt-fed, recoil-operated (with gas assistance) automatic weapon (fig. 1). Ammunition is fed into the gun by means of a disintegrating metallic link belt.

b. *Sights.*

- (1) The front sight assembly (fig. 2) consists of a front sight blade, adjusting nut, clamping screw, front sight post, bracket body, and a plunger mechanism.

The front sight post pivots on a bearing screw. The plunger mechanism provides a locking device to keep the front sight post in its upright position while the gun is being fired.

- (2) The rear sight (fig. 3) is mounted on a rear sight base and is adjustable for windage. The rear sight base is riveted to the left side of the receiver. The sight leaf is graduated for elevation in 200-yard divisions up to

2,400 yards. The windage scale is marked in 5-mil graduations for 10 mils right or left from zero.

c. *Flash Hider, M7.* The flash hider assembly M7 is attached to the front barrel bearing by means of a retaining clip assembly. The booster cap portion of the flash hider traps enough gas to insure positive recoil. This is important when the gun is fired at angles other than the horizontal.

d. *Bipod Mount.* The M1919A6 machinegun can be effectively fired from the integral bipod mount. The shoulder stock provides a means of supporting the rear of the bipod mounted gun. The carrying handle provides a method for carrying the weapon and can be positioned out of the gunner's line of sight. (For a detailed description of the tripod mount, see ch. 8.)

e. *Tripod Mount, M2.* The M2 tripod mount provides a stable and durable mount for the M1919A6 machinegun. Firing the gun from the tripod permits a high degree of accuracy and control. (For a detailed description of the tripod mount, see ch. 8.)

Table I. General Data

Ammunition.....	Caliber .30 ball, tracer, armor piercing, incendiary, armor piercing incendiary, blank, and dummy.
Weight of gun.....	23 pounds stripped (approx.).
Weight of pintle.....	1 pound.
Weight of traversing and elevating mechanism.	3 pounds.
Weight of flash hider.....	1 pound.

Total weight of machinegun, M1919A6 on mount M2 without bipod.	49 pounds.
Weight of machinegun M1919A6, with bipod and shoulder stock.	33 pounds.
Maximum range.....	3,200 meters.
Maximum effective range.....	1,100 meters.
Length of barrel.....	24 inches.
Rates of fire:	
Sustained.....	100 rounds per minute.
Rapid.....	200 rounds per minute.
Cyclic.....	600 to 875 rounds per minute.
Basic load of ammunition (on crew—gunner, assistant gunner, and ammunition bearer each carry one ammunition container).	750 rounds.
Maximum extent of grazing fire obtainable on level or uniformly sloping terrain.	600 meters.
Maximum traverse.....	50 mils.
Normal sector of fire (with tripod).	875 mils.
Tracer burnout.....	900 meters (approx.).

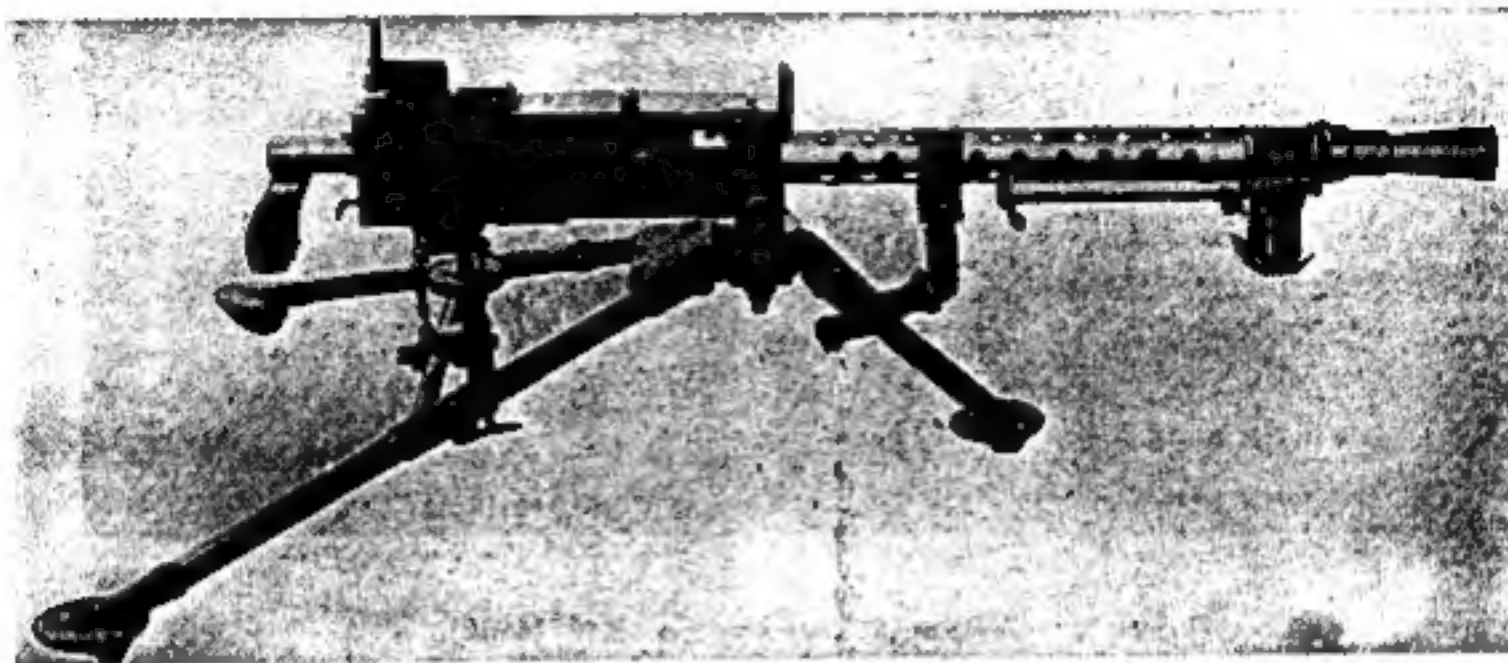
4. Caliber .30 Machinegun M37 (Tank)

a. *General.* The machinegun M37 (fig. 4) is a belt-fed, recoil-operated, air-cooled, automatic weapon. The gun is designed for fixed or flexible use. It is also designed for left- or right-hand feed. Ammunition is fed into the weapon by means of a disintegrating type metallic link belt. The M37 is primarily used as a coaxial machinegun; however, it may be used with the following mounts:

- (1) Weapon tripod mount, M74.
- (2) Machinegun tripod mount, M1917A1.
- (3) Caliber .30 machinegun tripod mount, M2.



1. Caliber .30, M1919A6 (Bipod)
Figure 1. Browning machinegun.



2. Caliber .30, M1919A6 (M2 mount)
Figure 1—Continued.

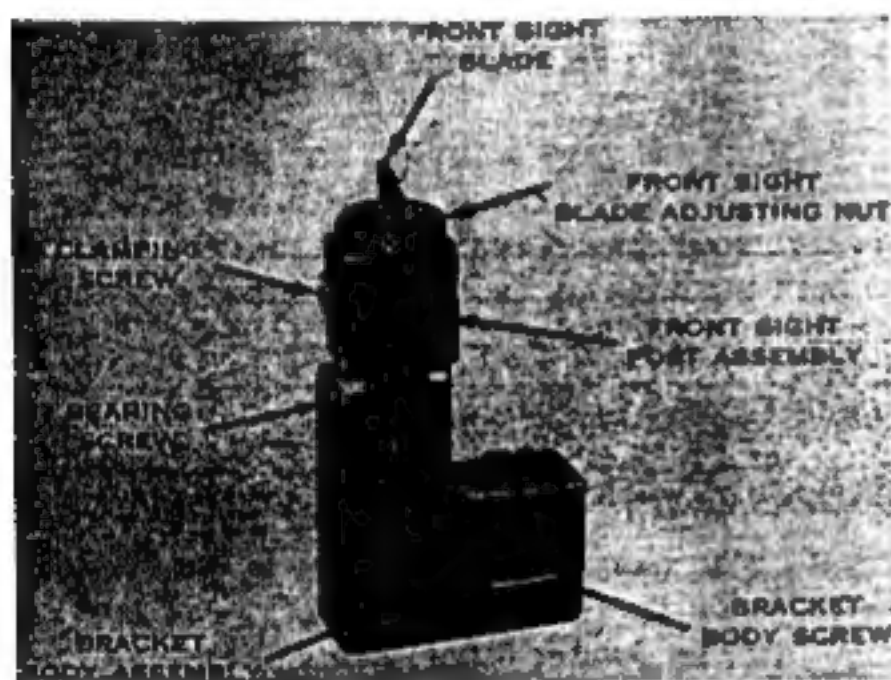


Figure 2. Front sight, machinegun, M1919A6.

b. *Sights.* The sights on this weapon are the same as those for the Browning machinegun, caliber .30, M1919A6.

Table II. General Data

Ammunition.....	Caliber .30 ball, tracer, armor piercing, incendiary, blank, and dummy.
Weight of gun.....	31 rounds.
Maximum range.....	3,200 meters (approx.).
Maximum effective range.....	900 meters (approx.).
Length of barrel.....	24 inches.

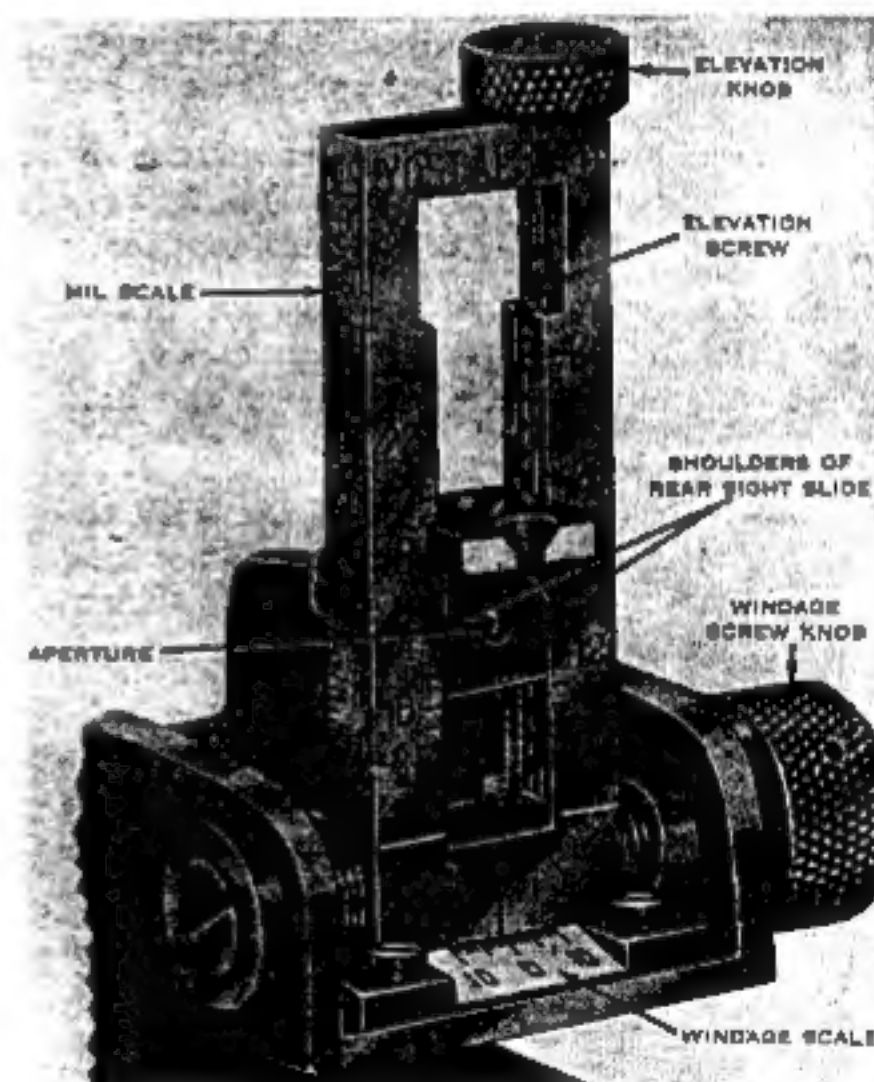


Figure 3. Rear sight, machinegun, M1919A6.

Rates of fire:	
Sustained.....	40 rounds per minute.
Cyclic.....	400-550 rounds per minute.

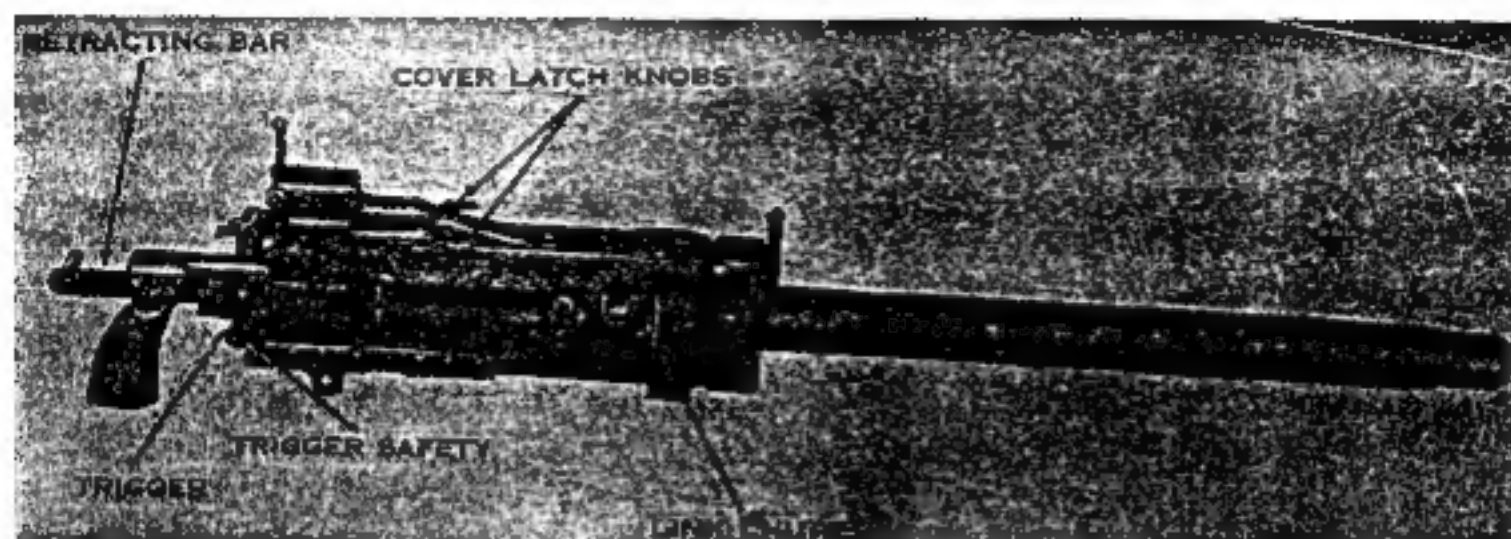


Figure 4. Caliber .30 machinegun M57 (tank).

5. Technique of Fire During Periods of Good Visibility

The information and techniques described in paragraphs 66 through 94, and 99 through 101, FM 23-63, apply to the caliber .30 machinegun M1919A6 with the following exceptions:

a. *Maximum Ordinates.* The maximum ordinates of caliber .30 ammunition (fig. 5) vary slightly from those of 7.62-mm ammunition.

b. *Beaten Zones.* The sizes of the beaten zones of the Browning machinegun, caliber .30 (fig. 6) vary slightly from those of the M60 machinegun.

c. *Rates of Fire.* The rates of fire with the Browning machinegun, caliber .30, do not lend same as those of the M60 machinegun except for the cyclic rate, which is 600 to 675 rounds per minute.

d. *Assault Fire.* The characteristics of the Browning machinegun, caliber .30, do not lend themselves easily to use of the weapon in the assault or on patrols; however, some occasions may dictate use of the weapon in such situations.

(1) When the weapon is employed in the

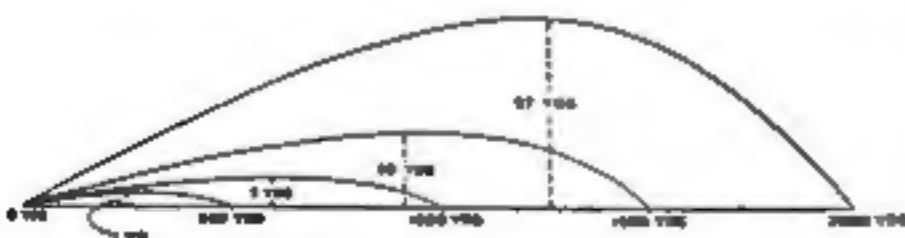


Figure 5. Maximum ordinates for M2 ball ammunition.

assault or on patrols, a sling should be improvised by coupling two rifle slings. The sling is attached to the grip, passed around the back of the neck, attached to the barrel jacket, and adjusted to the proper length (fig. 7).

- (2) To engage a target, the gunner faces the target squarely with his left foot slightly forward and his right foot to the rear to offset the recoil. The left hand grasps the carrying handle and the left arm is straight and rigid. The right hand grasps the grip with the forefinger on the trigger. The ammunition belt is slung over the left arm or shoulder, or it may be supported by the assistant gunner.
- (3) The gunner observes his fire by watching the tracer stream and beaten zones and adjust his fire as necessary.

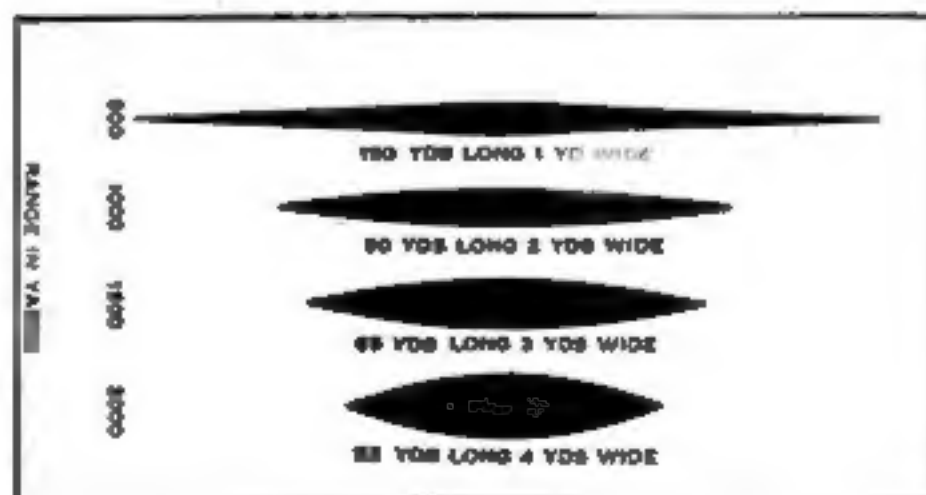


Figure 6. Approximate dimensions of beaten zones on level ground for M2 ball ammunition.

6. Tactical Employment

Information on tactical employment described in chapter 9, FM 23-67, applies to the Browning machinegun caliber .30, M1919A6,

with the exception of employment of the gun in the assault. Because of the weight and design of the M1919A6 machinegun, this method of employment is not recommended.



Figure 7. Assault firing position.

CHAPTER 2

MECHANICAL TRAINING

7. General

a. The machinegun has been designed so that it may be taken apart and put together easily. Force is not needed if it is assembled and disassembled correctly. As the parts are removed from the gun, lay them on a clean flat surface such as a table or shelter half in the same order that they are removed. This reduces the possible loss of parts and aids in the assembly of the gun since parts are replaced in reverse order.

b. The nomenclature of the machinegun is learned during disassembly and assembly. Each part is named as it is removed and replaced.

c. There are two types of disassembly and assembly: *general* and *detailed*. General disassembly and assembly involves removing and replacing the *groups*, while detailed disassembly involves removing and replacing the *components parts of each group*.



Figure 8. Shoulder stock, machinegun, M1919A6.

d. The individual soldier is instructed that frequent disassembly of all parts of the gun causes excess wear and possible loss of parts. Disassembly beyond the scope of this manual is not authorized.

8. General Disassembly

a. General.

- (1) To disassemble the main groups from the gun (field strip) the combination

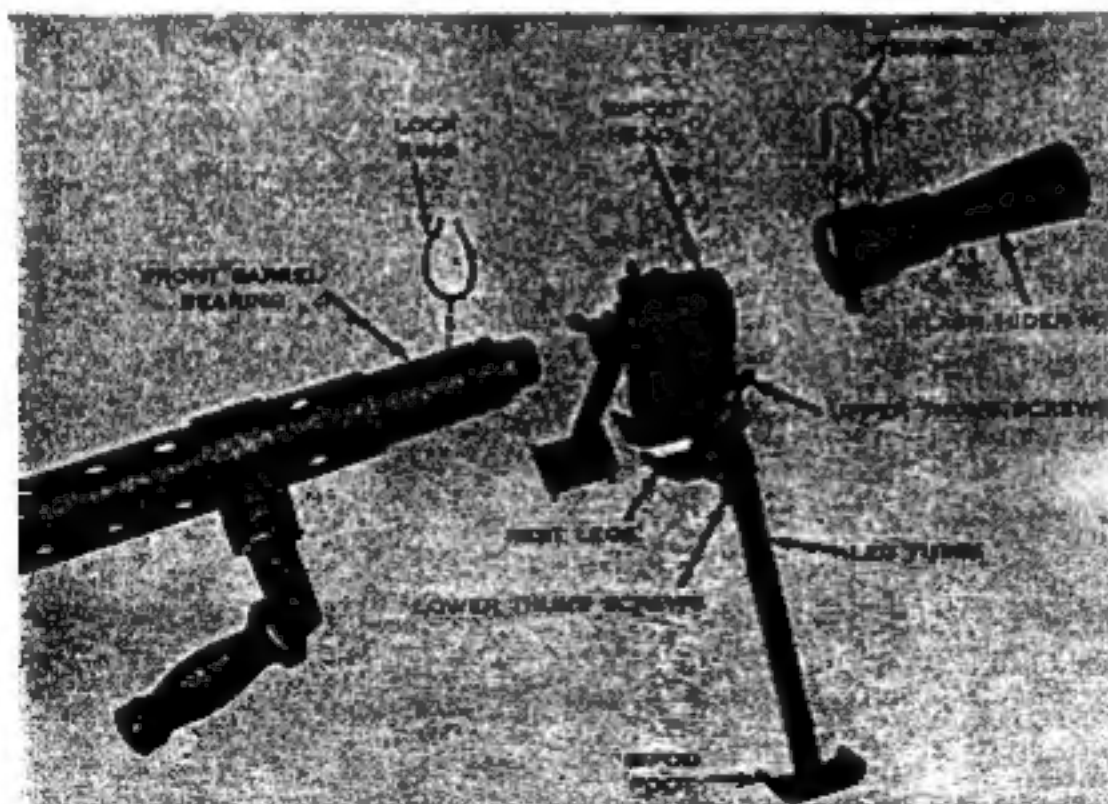
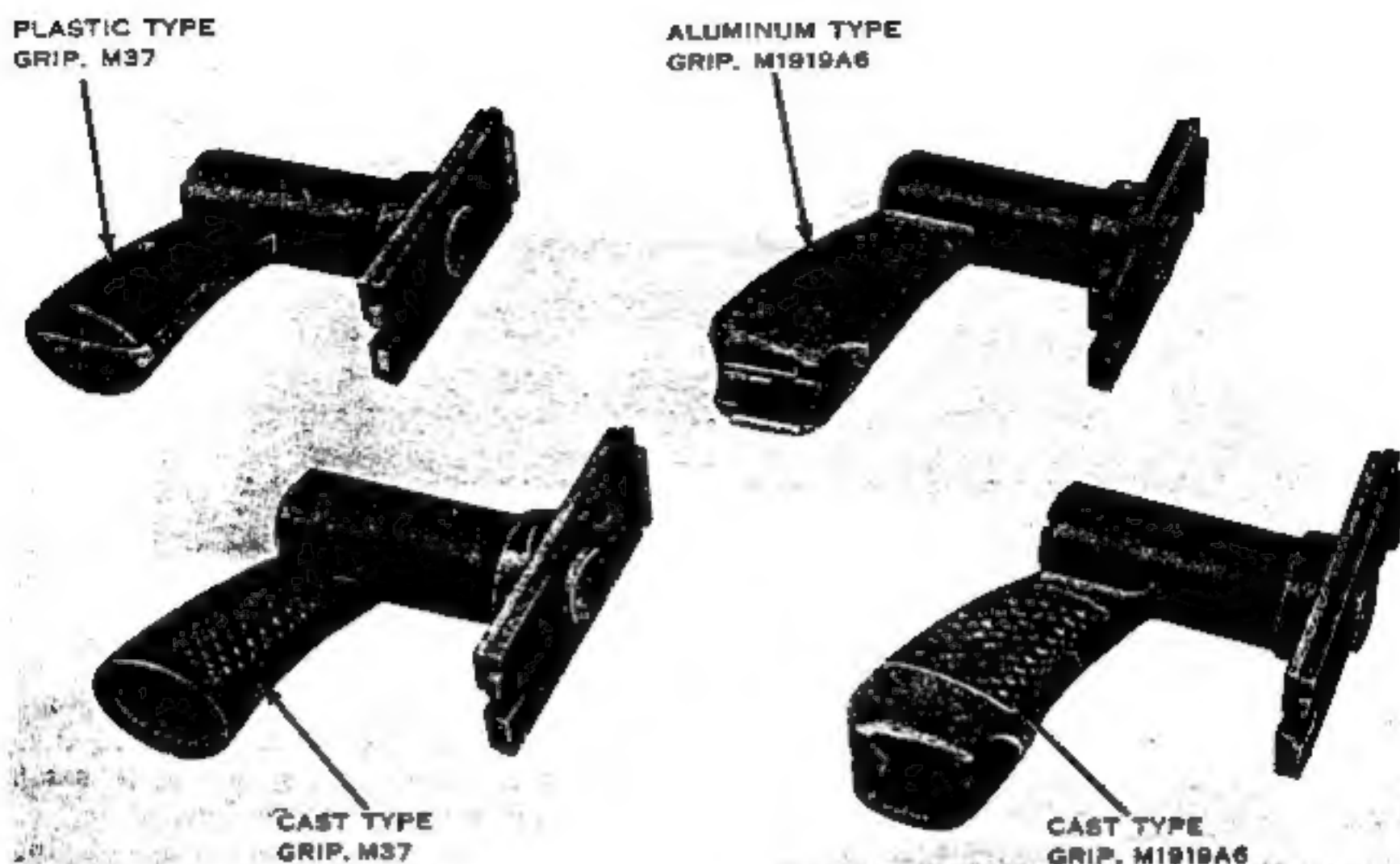


Figure 9. Bipod assembly, lockring, and retaining clip assembly, machinegun, M1919A6.



1. Backplate group
Figure 10. M1919A6 and M37 groups.

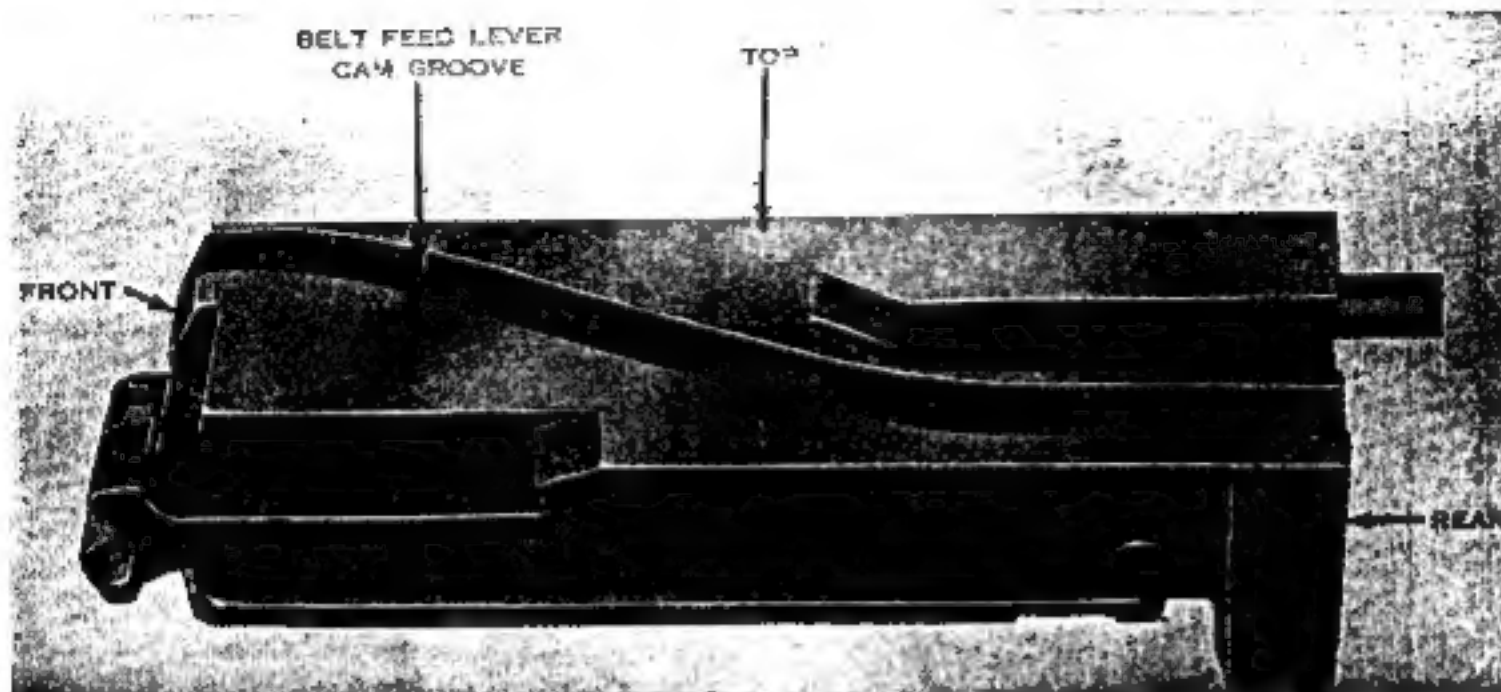
wrench (app VII) or a dummy cartridge can be used.

- (2) General assembly begins with the bolt forward and cover raised. Before the weapon is disassembled, it must be cleared as outlined in paragraph 29.
- (3) To remove the *shoulder stock* of the M1919A6 gun (fig. 8), loosen the wingnut on the clamp assembly and slide the stock assembly off the buffer tube.
- (4) To remove the flash hider M7 and bipod assembly of the M1919A6 gun (fig. 9), turn the flash hider one-quarter turn and remove it from the barrel bearing. Spread the lockring slightly and slide it off over the barrel bearing. Slide off the bipod assembly.

- (5) The M1919A6 is disassembled into the groups shown in figure 10 in the manner described in b through g below.
- (6) The M37 machinegun is disassembled into the groups shown in figure 11 in the manner described in b through g below.

b. *Backplate Group.*

- (1) Pull back on the cover latch and raise the cover. With the left hand, pull back on the bolt handle and hold it in its rearmost position.
- (2) With the right hand, insert the rim of a cartridge or the screwdriver end of the combination wrench in the slit in the end of the driving spring rod. With the slit horizontal, push in on the driving spring rod as far as it will go and turn it clockwise one-quarter turn until the slit is vertical (fig. 12).



2. Bolt group
Figure 10—Continued.

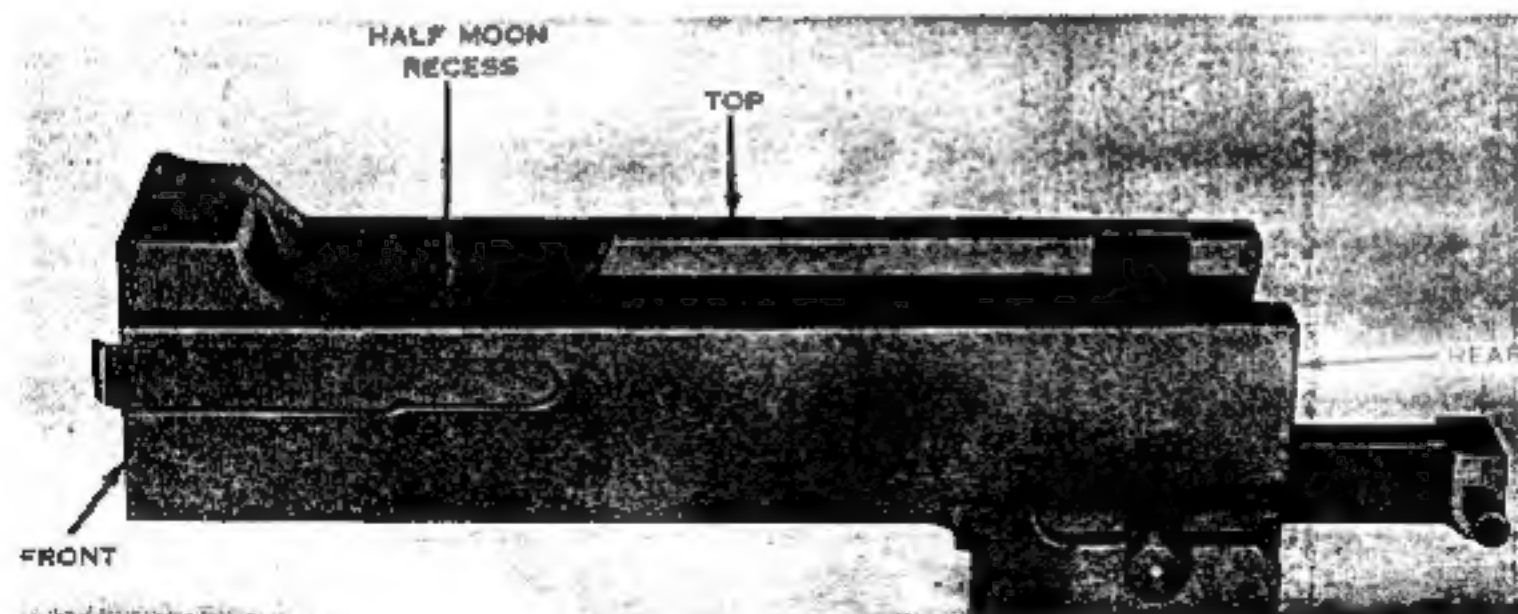


3. Lock frame group
Figure 10—Continued.

- (3) In this position, the driving spring rod pin engages in its recess in the bolt and the driving spring is held compressed within the bolt.

Caution: The driving spring rod pin must be securely locked in its recess in the rear of the bolt before the backplate is removed.

- (4) Push the bolt handle forward 1 inch to clear the rear of the driving spring rod from the backplate. Push the cover latch forward and lift up on the backplate (fig. 13).



4. Barrel extension group
Figure 10—Continued.



b. Cover group
Figure 10—Continued.

- (5) For the backplate group, machinegun M87 (tank), press the backplate latch lock to the right, and push the backplate latch down. Lift the back-

plate assembly up and out of the receiver (fig. 14).

c. Bolt Handle and Bolt.

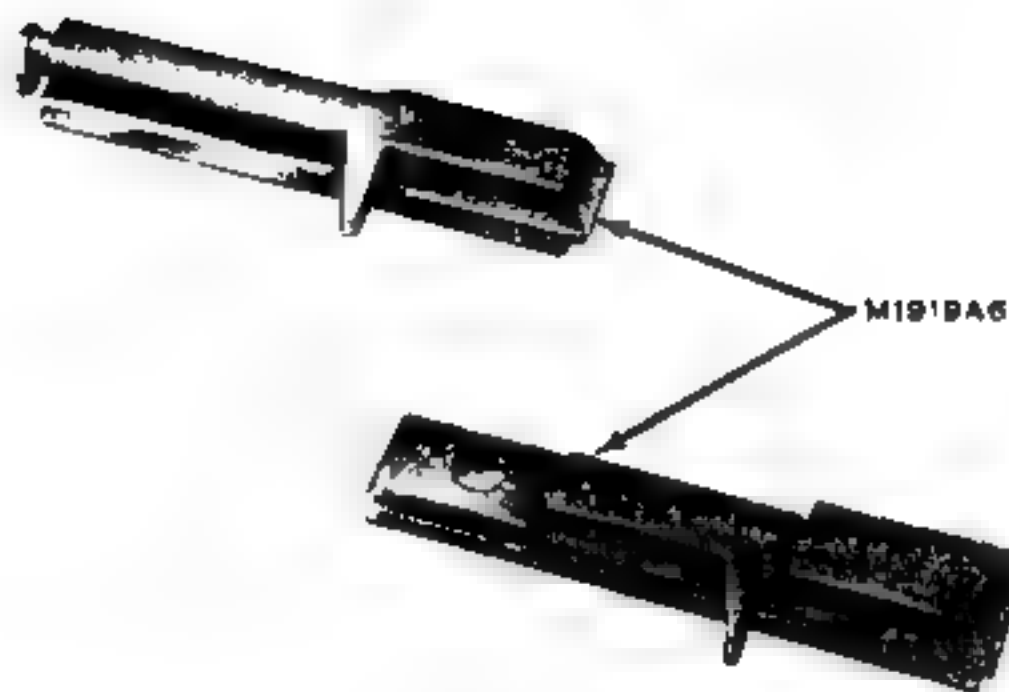
- (1) Pull the bolt all the way back and remove the bolt handle to the right.
- (2) Remove the bolt from the rear of the receiver (fig. 15).
- (3) For the bolt group, machinegun M87 (tank)—
 - (a) Insert the nose of a cartridge in the recessed end of the driving spring assembly. Push fully forward and to the left until the driving spring rod head is free of its slot in the right side plate assembly (fig. 16). Withdraw the driving spring assembly from the bolt and out of the receiver.
 - (b) Move the bolt rearward until the bolt stud is alined with the bolt stud aperture in the right side plate assembly, and remove the bolt stud.
 - (c) Remove the bolt from the rear of the receiver (fig. 17).

d. Lock frame.

- (1) Insert the nose of a cartridge or the punch of the combination wrench through the hole in the right side of the receiver and push in on the trigger pin (fig. 18).
- (2) Grasp the trigger and pull the lock frame, barrel extension, and barrel out of the rear of the receiver until the lower rear lugs of the barrel extension hang down behind the bottom of the receiver (fig. 19). If resistance is met, pull on the spacer of the lock frame to avoid damage to the trigger.
- (3) Hold the lock frame in both hands, trip the accelerator, and separate the lock frame from the barrel extension (fig. 20).

e. Barrel Extension and Barrel. Remove the barrel and barrel extension from the receiver and unscrew them (fig. 21).

f. Cover Latch. Pull the cover latch to the rear and remove it from the top plate of the receiver.



c. Latch assembly
Figure 10—Continued.

g. Cover.

- (1) Remove the cotter pin from the castle nut (cover bolt nut). Place the screwdriver end of the combination wrench in the slit in the cover bolt to prevent the bolt from turning and unscrew the cover bolt nut (fig. 22).
- (2) Remove the cover bolt (fig. 23), cover catch spring, the fixed and movable plates, and the cover. To prevent undue wear, the cover should not be removed except when necessary for cleaning or replacement of parts.

9. General Assembly

a. Cover. Place the cover catch spring on the cover bolt and position the fixed and movable plates. Reinsert the cover bolt. Place the screwdriver end of the combination wrench in the slot on the cover bolt to prevent it from

turning, and screw the cover bolt nut on the cover bolt until the desired tension is obtained. Replace the cotter pin.

b. Cover Latch. Push the cover latch onto the top plate from the rear.

c. Barrel Extension and Barrel. Screw the barrel extension together until the rear of the barrel is flush with the inside of the barrel extension. Place the barrel and barrel extension into the receiver until the lower rear lugs of the barrel extension hang down behind the bottom plate of the receiver.

d. Lock Frame.

- (1) Hold the lock frame in both hands keeping the claws of the accelerator in front of and against the T-lug on the barrel extension with the forefingers (fig. 24).
- (2) Start the front projections of the lock

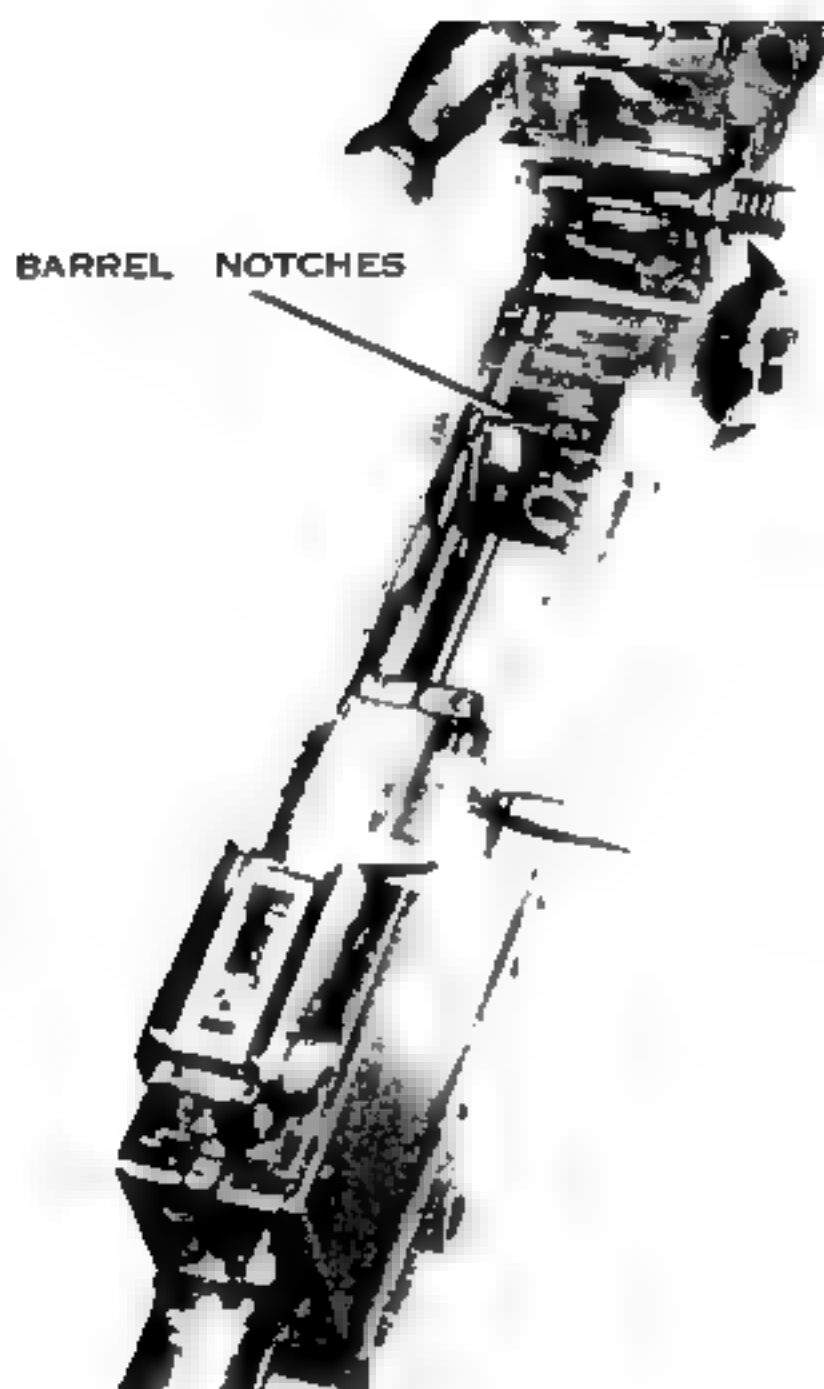


Figure 10—Continued.

frame into the recess in the barrel extension making sure that the concave surface the barrel plunger is in contact with the barrel extension plunger stud on the T-lug. Press forward until the accelerator turns backward between the rear end of the barrel extension and T-lug and locks the lock frame to the barrel extension. Locking the frame to the barrel extension compresses the barrel plunger spring.

- (3) Press the tips of the accelerator down to insure positive locking.
- (4) With the lock frame in position, guide the barrel, barrel extension, and lock frame into the rear of the receiver.
- (5) Push these groups forward with the left hand, and with the right hand push in on the trigger pin so that it clears the side of the receiver (fig. 25). The forward motion is continued until the trigger pin snaps into its recess in the side of the receiver.

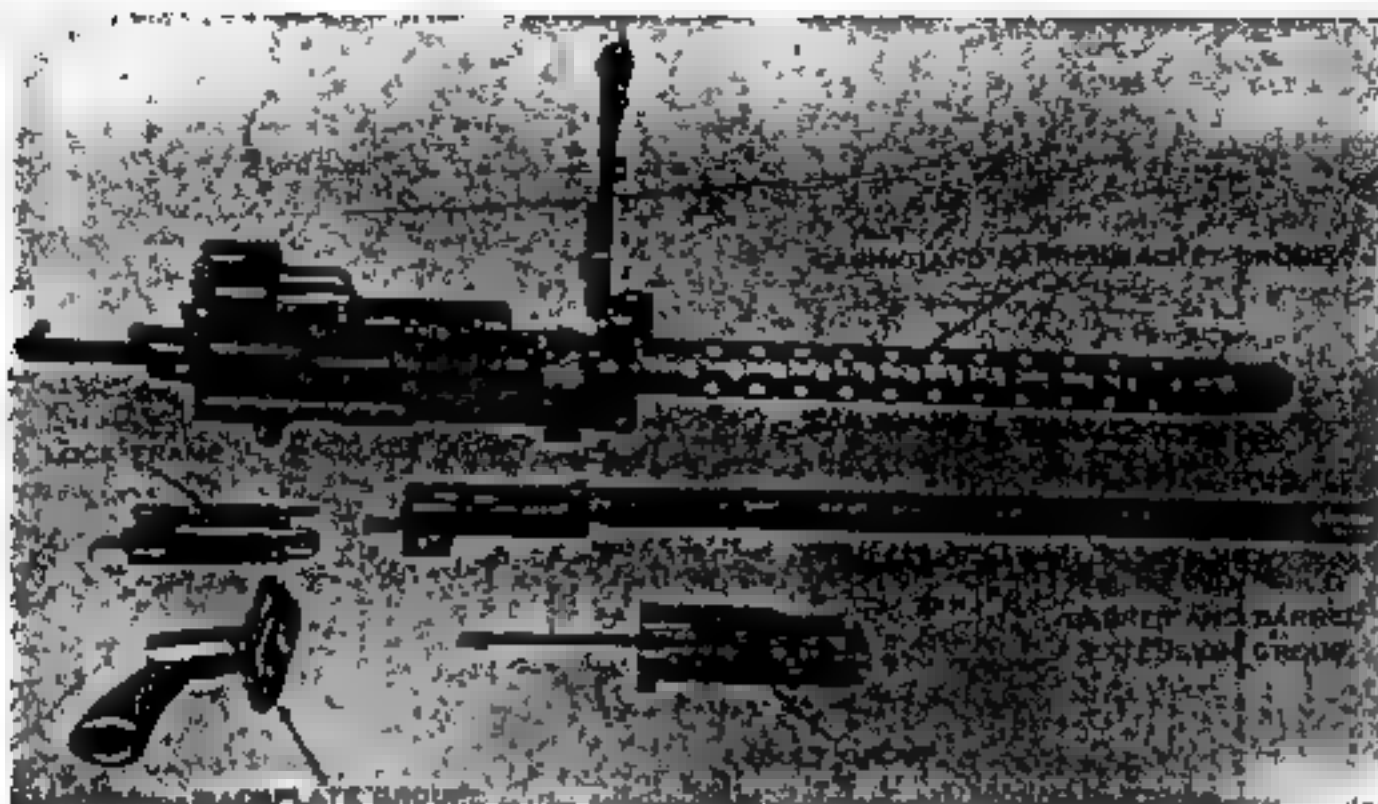


Figure 11. The major groups removed from inside the receiver (M37).



Figure 13. Seating the driving spring rod.

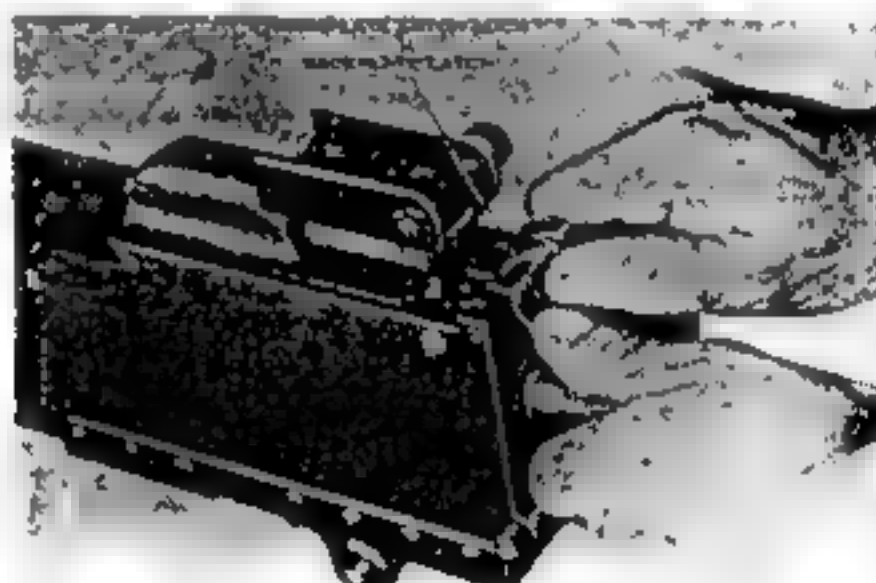


Figure 14. Removing (replacing) the backplate group, M37.



Figure 13. Pressing the cover latch forward and lifting up the backplate group.



Figure 15. Removing the bolt from the receiver.

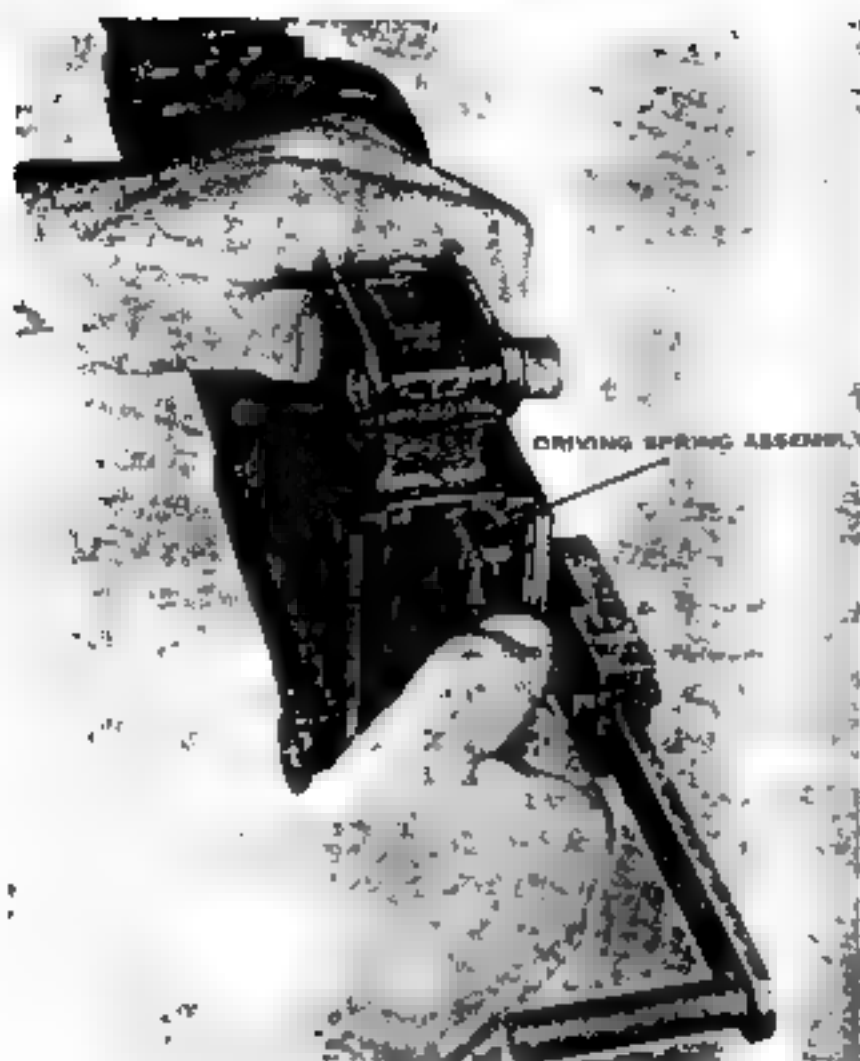


Figure 16. Removing (replacing) driving spring assembly M37.



Figure 17. Removing the bolt from the receiver M37.

e. Bolt and Bolt Handle.

- (1) Inspect the bolt group to see that the extractor is in a forward position and is all the way down against the stop. The cocking lever must be placed all the way forward and care taken not to press on the sear or driving spring rod.



Figure 18. Pushing in on the trigger pin.

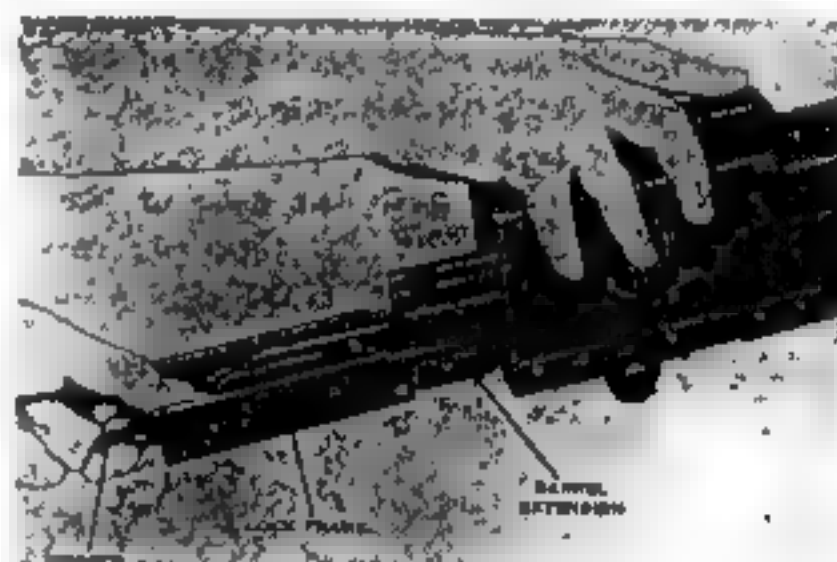


Figure 19. Withdrawing the lock frame from the receiver.

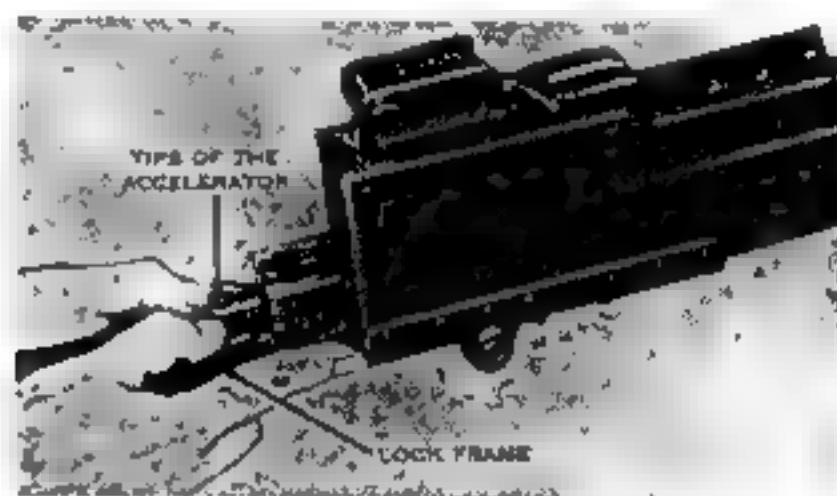


Figure 20. Separating the lock frame.

- (2) Grasp the bolt by the rear end and start the bolt into the receiver with the forward end slightly higher than the rear. Push down on the rear end of the trigger to prevent the front of the bolt from tripping the accelerator (fig. 26).



Figure 21. Separating the barrel and barrel extension.

- (8) When the front end of the bolt begins to ride on its guides in the barrel extension, raise the rear end of the bolt and push in horizontally.
- (4) When the bolt handle hole in the bolt comes into line with the rear of the slot in the side of the receiver, replace the bolt handle. Make sure that

the collar of the bolt handle is positioned inside of the receiver before pushing the bolt fully forward (fig. 27).

- (5) For the M37 machinegun, replace the retracting bar (fig. 28). Replace the bolt by aligning the bolt stud hole in the bolt with the corresponding hole in the right side plate, then insert the bolt stud (fig. 29). Place the driving spring assembly in the bolt grasp; push forward on the driving spring rod until the bolt group moves forward and is locked to the barrel extension. Press the driving spring rod to the right to engage the head in its slot in the right side plate (fig. 16).

f. Backplate Group.

- (1) Move the cover latch forward so that the backplate may enter the backplate guideways.

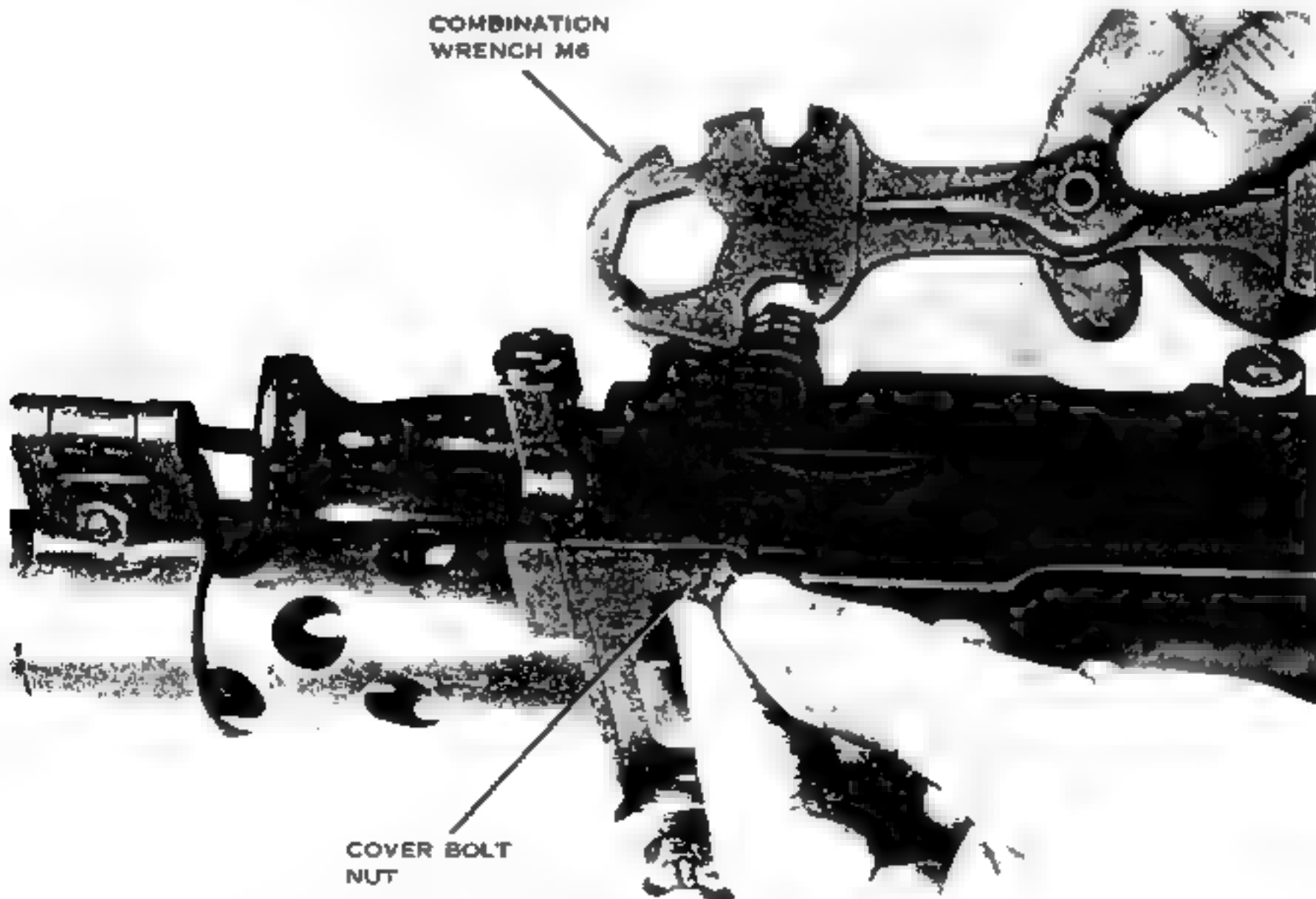


Figure 22. Removing cover bolt nut from cover bolt.

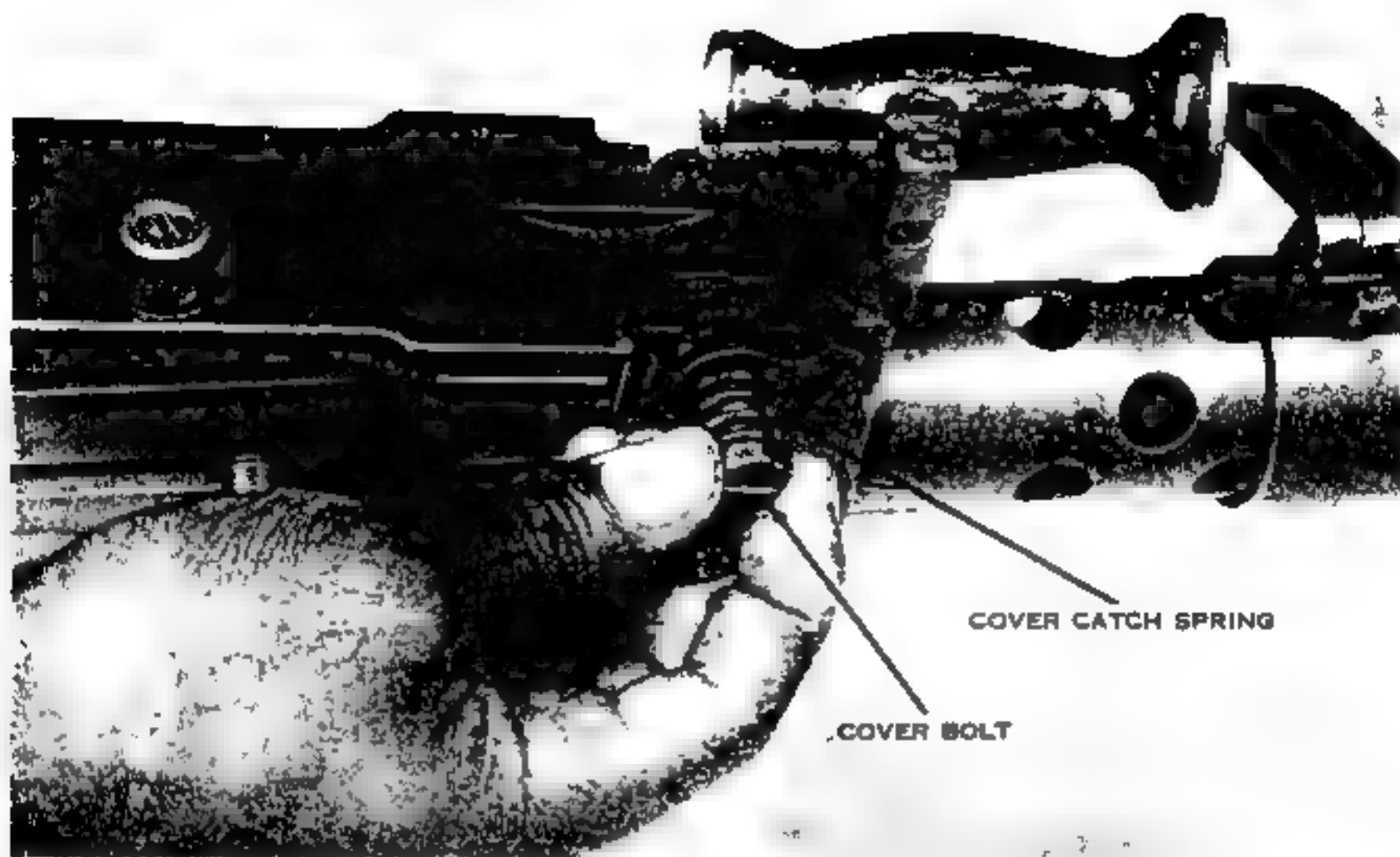


Figure 23. Removing cover bolt.

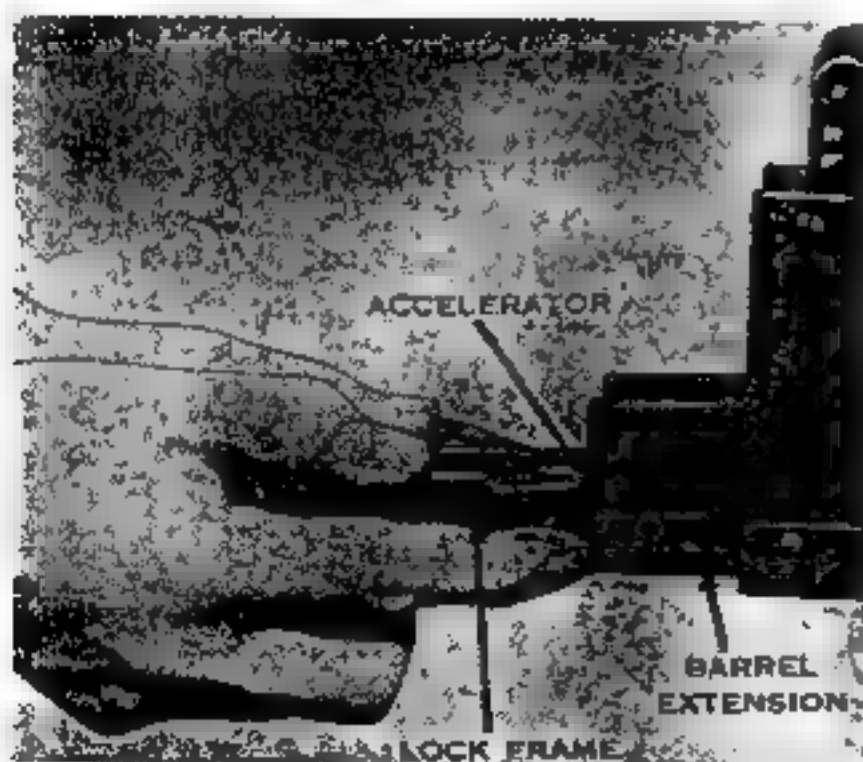


Figure 24. Assembling the lock frame to the barrel extension.

- (2) Replace the backplate group.
- (3) Pull the cover latch to the rear, locking the backplate in place.
- (4) Hold the bolt handle to the rear with the left hand. Place the rim of a cartridge or the screwdriver end of the combination wrench in the slit in the end of the driving spring rod, and turn it one-quarter turn counterclockwise. This releases the driving spring.
- (5) Release the bolt and allow it to go forward.
- (6) Making sure that the extractor is down and the belt feed lever stud is to the left, lower and latch the cover.
- (7) Raise the trigger to release the firing pin.
- (8) Lower the sight(s).

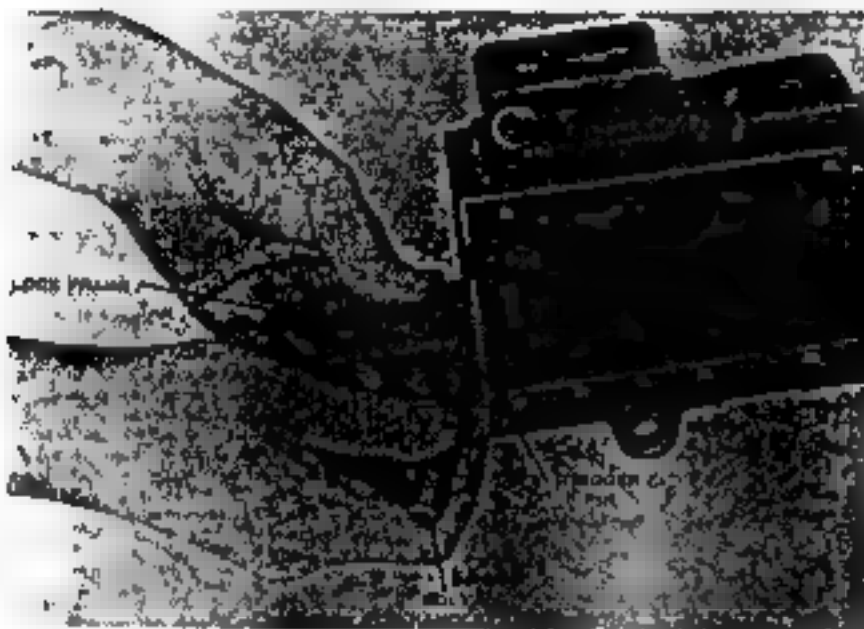


Figure 26. Pushing in on the trigger pin.



Figure 27. Replacing the bolt handle.

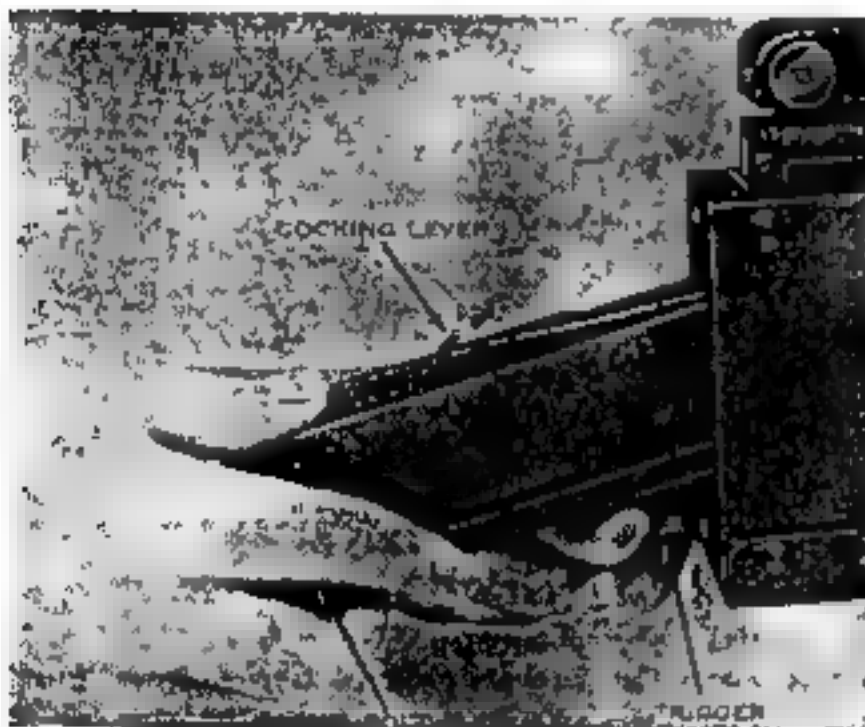


Figure 28. Starting the bolt into the receiver.

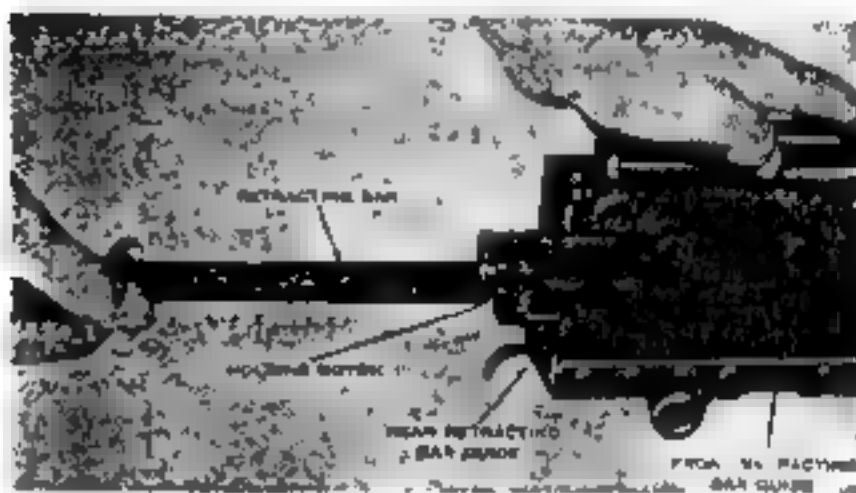


Figure 29. Replacing the retracting bar (M37).

(9) For the backplate group, machinegun M37 (tank)—

- (a) Engage the backplate grooves with the corresponding grooves in the side plates of the casing.
- (b) Release the backplate latch lock by pressing it to the right, and depress the backplate latch. Slide the backplate group down. Release the latch, and lock it into place.
- (c) Check to see that the backplate is positively locked.



Figure 30. Replacing the bolt stud (M37).

g. Shoulder Stock and Bipod Assembly.

- (1) To replace the shoulder stock of the machinegun, M1919A6, slide the stock onto the buffer tube and tighten the wingnut.
- (2) To replace the bipod assembly and flash hider assembly, place the bipod assembly on the front barrel bearing and replace the lockring. Check the retaining clip assembly to see that the pins are engaged in their notches in the side of the flash hider. Place the flash hider on the front barrel bearing, making sure that the slots in the flash hider coincide with the slots in the front barrel bearing. Push the retaining clip assembly until it snaps into the slots in the bearing (fig. 9).

10. Headspace Adjustment

a. Headspace. The headspace of a weapon is the distance between the face of the bolt and the base of a cartridge fully seated in the chamber. With Browning machineguns, the conditions necessary for correct headspace are met only when the bolt is correctly locked to the barrel and barrel extension.

b. Headspace Adjustment. Headspace adjustment is that adjustment which controls the positioning of the breech lock in its recess in the bottom of the bolt. *Correct headspace adjustment* is necessary to prevent sluggish operation, damage to the weapon and ruptured or separated cartridge cases. Headspace adjustment is correct when the following conditions exist:

- (1) The recoiling groups are fully forward.
- (2) The breech lock is positioned in its recess in the bolt so that the forward edge of the breech lock is in contact with, but not binding against the forward wall of that recess.
- (3) There is no independent rearward movement between the bolt, and the barrel and barrel extension.

c. Adjustment With the Parts Inside the Receiver.

- (1) The gun should be fully assembled when making headspace adjustment.
- (2) Pull the bolt to the rear about three-quarters of an inch.
- (3) Screw the barrel into the barrel extension, using the nose of a cartridge or the combination wrench in the barrel notches, until the recoiling parts are unable to go fully forward under the pressure of the driving spring when the bolt is released from three-fourths of an inch distance. The barrel notches will be visible between the trunion block and the barrel extension (7, fig. 10).
- (4) Unscrew the barrel from the barrel extension one notch at a time, checking after each notch until the barrel and the barrel extension goes fully forward without being forced.
- (5) Unscrew the barrel two additional notches. This compensates for heat expansion of the barrel when the gun is fired. Correct headspace adjustment now exists.

d. Adjustment With the Parts Outside the Receiver.

- (1) Headspace adjustment can be made before the recoiling groups are assembled into the receiver. However, the adjustment should be checked after the gun is assembled.
- (2) Screw the barrel and barrel extension together until the rear of the barrel is flush with the inside of the barrel extension.
- (3) Remove the extractor from the bolt. Place the bolt in the bolt guides of the barrel extension and push the bolt fully forward (fig. 30).
- (4) Lock the bolt to the barrel and barrel extension by pushing the breech lock fully into its recess in the bottom of the bolt. Hold it firmly in that position with the thumb (fig. 31). Screw the barrel and barrel extension

together until the barrel is stopped by contact with the bolt. Make certain that the barrel does not force the breech lock from its fully locked position.

- (5) Unscrew the barrel from the barrel extension one notch at a time until the breech lock falls of its own weight. Remove the bolt.
- (6) Screw the barrel and barrel extension together one notch. Adjustment is now correct.

e. Improper Headspace Adjustment.

- (1) *Loose adjustment.* When the headspace adjustment is loose, there is an independent movement of the bolt to the rear from the barrel and barrel extension. In order to determine if loose headspace adjustment exists, lay the right hand (palm down) on the bolt handle very lightly, to take out any lateral play in the operating groups. Then place two fingers of the left hand over the front of the bolt and pull to the rear. If the bolt moves to the rear independently of the barrel and barrel extension, loose headspace adjustment exists. Loose adjustment may cause a ruptured cartridge when the bolt is violently started to the rear independently of the barrel and barrel extension.
- (2) *Tight adjustment.* When the headspace adjustment is tight, it will result in poor functioning, characterized by a sluggish rate of fire. This is due to increased friction between the breech lock, the breech lock cam, and the breech lock recess of the bolt. Stoppages result because the moving parts bind, and the bolt, barrel extension, and barrel may not always go forward. When the notches on the rear of the barrel can be seen the bolt group is not fully forward, and the firing pin cannot be released by raising the trigger; the headspace adjustment is too tight to allow the

breech lock to fully enter its recess on the bottom of the bolt. The location of the bolt group can be rapidly determined by noting the location of the bolt handle.

f. Check. Always check to be sure that the hook of the barrel locking spring is engaged in the barrel notches, so that the headspace adjustment cannot change during firing.

11. Detailed Disassembly of the Bolt (figs. 32 and 33).

a. Extractor Assembly. Raise the extractor and remove it from the bolt.

b. Driving Spring Rod. Great care must be exercised in removing the driving spring and the driving spring rod from the bolt, as the force of the driving spring, when released, can easily cause the rod to jump from the hand and may result in serious injury.

- (1) To remove the driving spring rod and driving spring, place the protruding

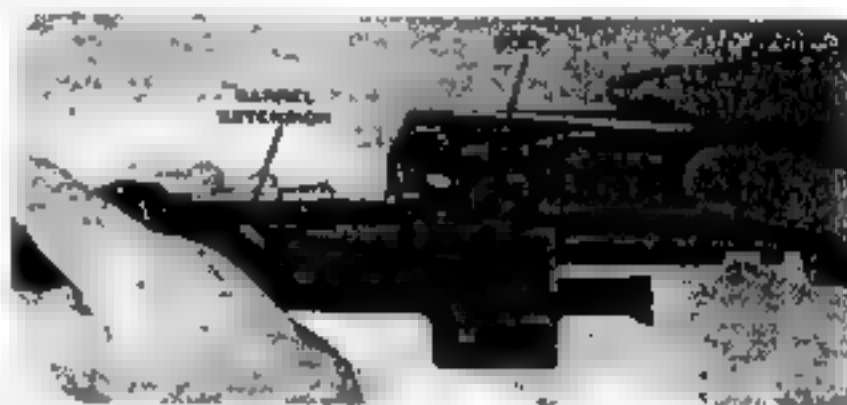


Figure 30. Assembling the bolt to the barrel and barrel extension.



Figure 31. Locking the bolt to the barrel and barrel extension.

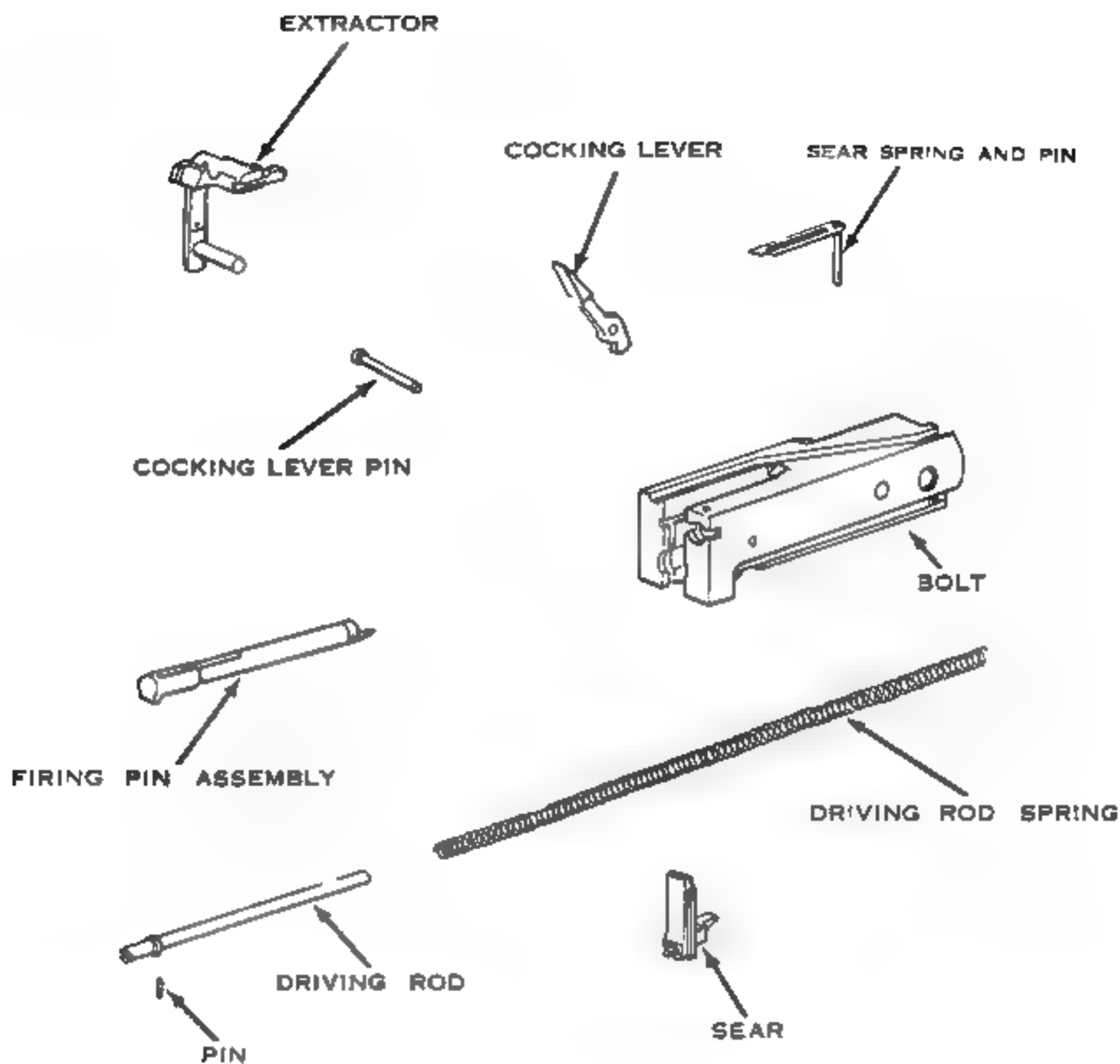


Figure 32. Bolt group.

end of the rod on a wooden surface or the edge of an ammunition container. Grasp the bolt firmly in the right hand with the palm of the hand over the face of the bolt. Press down and at the same time turn the bolt one-quarter turn to the left, releasing the driving spring rod pin from its recess in the bolt (fig. 34).

- (2) Slowly release the pressure in the bolt allowing it to rise under the action of the driving spring until about three inches of the rod protrudes. Grasp the protruding portion of the rod and spring in the left hand (fig. 35). Separate the bolt from the rod and spring with a quick jerk. Keep the driving spring rod, spring,

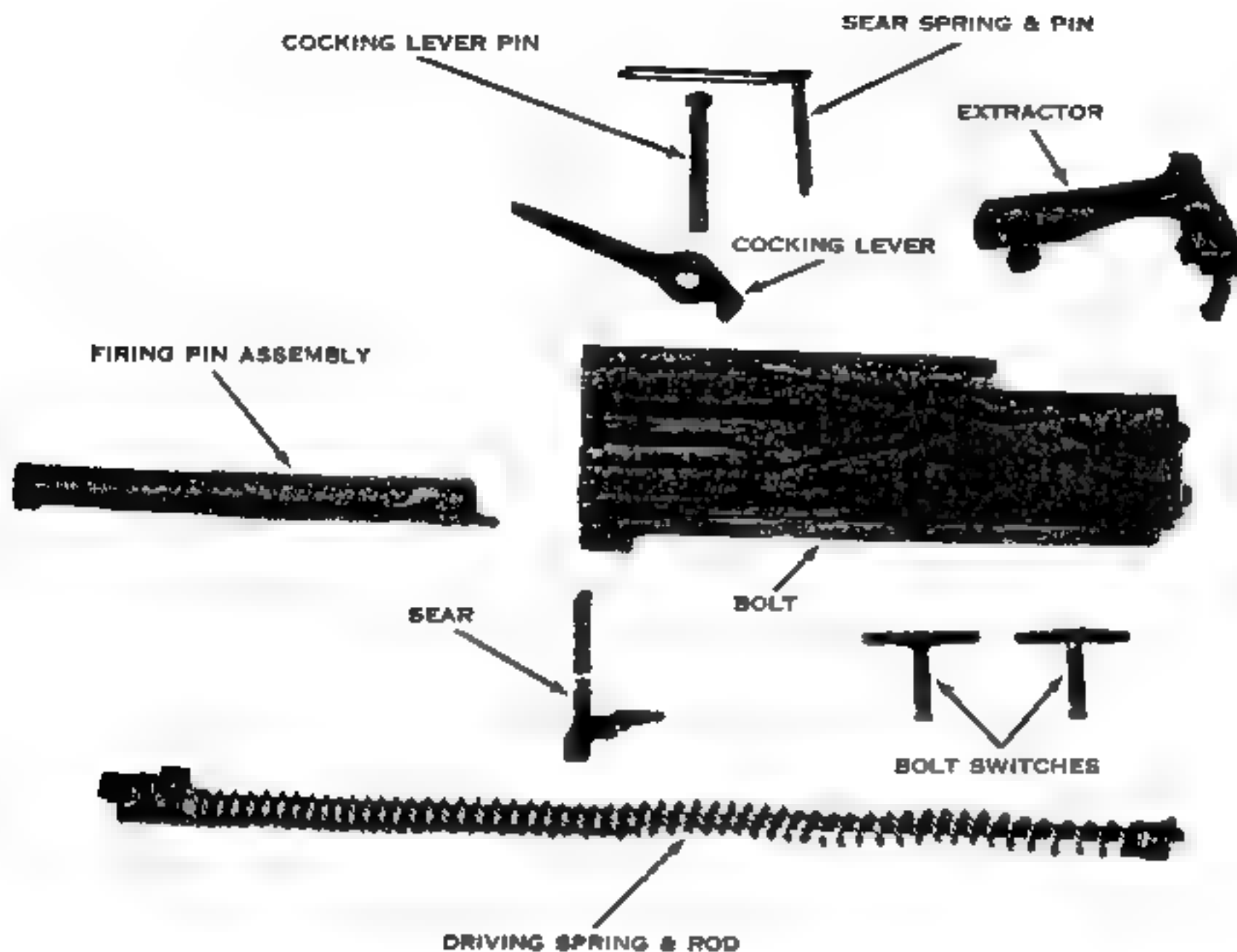


Figure 22. Bolt group (M37).

and the bolt in line to prevent the spring from kinking.

- (3) Separate the driving spring and the driving spring rod.

c. Cocking Lever. Rotate the top of the cocking lever to the rear of the bolt and withdraw the cocking lever pin from the bolt (fig. 86). Lift out the cocking lever.

d. Sear.

- (1) Hold the bolt with the front toward the body and release the firing pin by pushing down on the sear.

- (2) Place the nose of a cartridge or the top of the cocking lever near the end of the sear spring away from the sear spring pin, and push downward and to the right on the spring to seat it in the recess in the bolt (fig. 37). This releases the sear, which is removed from the bottom of the bolt (fig. 38).

e. Sear Spring and Pin. Rotate the sear spring back to its normal position. Push the nose of a cartridge into the hole in the bottom



Figure 34. Releasing the driving spring rod and spring.

of the bolt to start the sear spring pin moving outward. Place the top of the cocking lever under the sear spring and pry the pin out of the bolt (fig. 35).

f. Firing Pin. Place the palm of the hand under the rear of the bolt, tilt the rear end of the bolt down, and allow the firing pin to fall out into the palm of the hand.

g. M37 Machinegun.

- (1) Drift out the bolt switch pins.
- (2) Lift out the bolt switches. (The bolt switches should not be removed unless the feeding is being changed.)

12. Assembly of the Bolt

a. Bolt Switches (M37 only). Replace the bolt switches for proper feeding

b. Bolt Switch Pins (M37 only). Replace

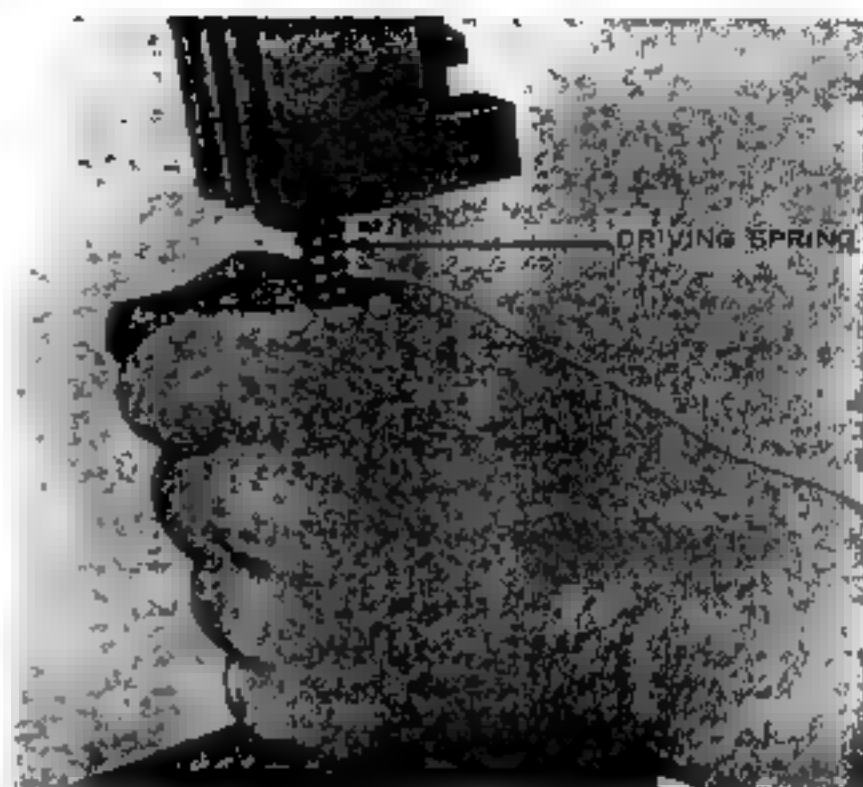


Figure 35. Removing the driving spring rod and spring.



Figure 36. Removing the cocking lever pin.

the bolt switch pins, being sure that the pins are flush or even with the bolt.

c. Firing Pin. Place the the firing pin into the bolt, striker down and to the front. Tilt the front of the bolt downward until the striker projects through the aperture in the face of the bolt.

d. Sear Spring and Pin. Replace the sear spring and pin by inserting the pin in its recess and pushing it all the way down. Avoid pressure on the leaf of the sear spring itself.

e. Sear.

- (1) Hold the bolt in the left hand with



Figure 37. Releasing the sear spring.

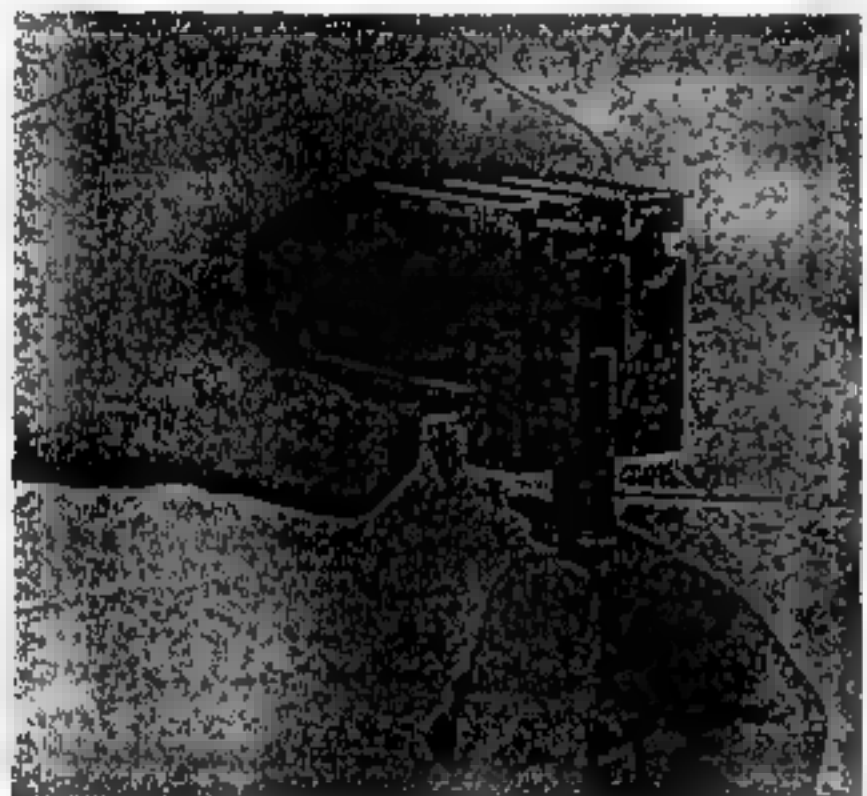


Figure 38. Removing the sear.

the front toward the body and the top up. With the point of a cartridge placed near the end of the sear spring and away from the pin, push downward and to the right to seat its edge in the recess in the bolt.

- (2) With the sear platform toward the bolt, push the sear upward from the bottom.
- (3) Press down and to the left on the sear spring with a cartridge to engage the end of the spring in the sear.



Figure 39. Removing the sear spring and pin.

f. Cocking Lever.

- (1) Place the cocking lever, with the rounded nose down and to the rear and the top extending rearward, into its recess in the bolt until the pin-hole aligns with the cocking lever pin-holes in the sides of the bolt.
- (2) Insert the cocking lever pin.
- (3) To test the correctness of the assembly, cock by rotating the top of the cocking lever toward the front of the bolt, then rotate it to the rear and press down on the sear with a cartridge. This should release the firing pin.

g. Driving Spring Rod. The same degree of care should be exercised in assembling the driving spring and rod into the bolt as in removing it.

- (1) Place the driving spring on the driving spring rod. With the slit end of the rod resting on a wooden surface

or the edge of an ammunition can, gather as much of the spring on the rod as can be held compressed by the thumb and fingers of the left hand.

- (2) With the bolt securely held in the right hand, front end of the bolt in the palm of the hand, slip the bolt over the end of the spring. Push downward to compress the spring and allow the driving rod pin to enter the slot in the side of the bolt.
- (3) Turn the bolt slowly one-quarter turn clockwise until the slit in the rod is vertical to the slot in the rear of the bolt and the pin is firmly engaged. *Use caution in checking correct assembly.*

h. Extractor. Insert the extractor stud in the rear hole of the two large holes in the left side of the bolt, the extractor pointing up. Turn the extractor downward toward the front to engage the collar on the extractor under the collar cut in the bolt.

13. Detailed Disassembly of the Lock Frame (fig. 40)

a. Accelerator. Drift out the accelerator pin with the point of a cartridge and remove the accelerator. (The breech lockpin and accelerator pin are interchangeable.)

b. Trigger. Withdraw the trigger pin (fig. 41). Lift out the trigger. If the pin is too tight to permit its removal by use of the fingers, it must be drifted out. Do not remove the trigger pin spring except when necessary.

c. Barrel Plunger.

- (1) Hold the lock frame with the left hand, projections pointing upward, first and second fingers gripping the barrel plunger spring.
- (2) Press down and out on the barrel plunger with the thumb of the right hand to disengage the barrel plunger guide pin from its slot (fig. 42).
- (3) Allow the barrel plunger and spring to rise slowly.

- (4) Lift out the spring and separate it from the barrel plunger.

14. Assembly of the Lock Frame

a. Barrel Plunger.

- (1) Assemble the barrel plunger and spring.
- (2) Holding the lock frame as in disassembly, seat the end of the barrel plunger spring in the recess in the lock frame separator with the barrel plunger guide pin facing the slot in the lock frame.
- (3) With the first and second fingers of the left hand, guide the barrel



Figure 40. Lock frame group.

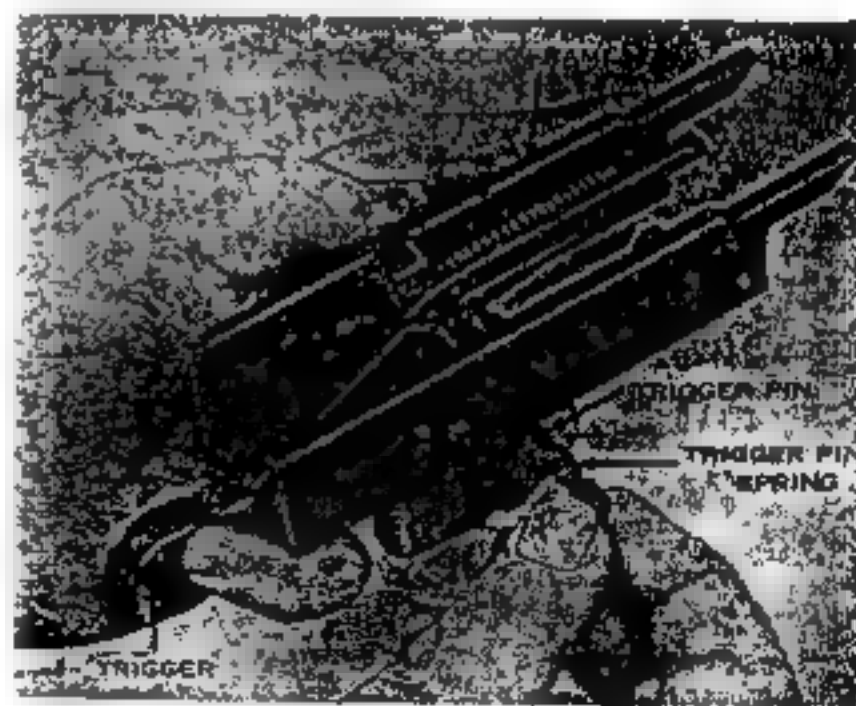


Figure 41. Removing the trigger pin.

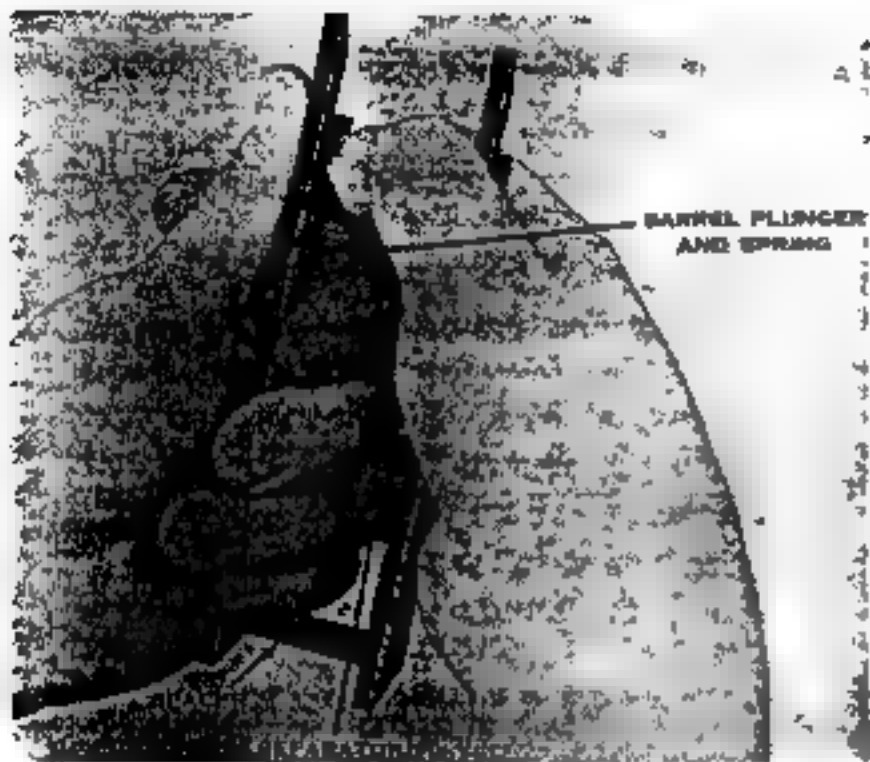


Figure 43. Removing the barrel plunger and spring.

plunger spring while the right thumb pushes the barrel plunger head downward, until the barrel plunger guide falls into its slot in the side of the lock frame. Use caution to prevent injury.

b. Trigger.

- (1) Insert the front of the trigger under the spacer and over the separator, placing the center in its square seating.
- (2) If the trigger pin has been removed, seat the spring on the trigger pin, placing the small end of the spring toward the head of the pin.
- (3) Replace the trigger pin and spring.

c. Accelerator. Replace the accelerator with the tips up and the rounded surface to the front. Insert the accelerator pin so that the ends of the pin are flush with the sides of the lock frame.

15. Detailed Disassembly of the Barrel

Extension
(fig. 43)

a. Barrel Locking Spring. Insert the rim of the cartridge under the hook of the barrel locking spring and pull it out.

b. Breech Lock. Drift out the breech lockpin and remove the breech lock.

16. Assembly of the Barrel Extension

a. Breech Lock.

- (1) Place the breech lock in its slot, with the double beveled edge up and to the front.
- (2) Insert the breech lockpin and insure that the ends of the pin are flush with the sides of the barrel extension.

b. Barrel Locking Spring. Insert the barrel locking spring in its recess, hook inward, and push it as far as it will go. The barrel locking spring should be removed only when necessary.

17. Detailed Disassembly of the Cover (M1919A6)
(fig. 44)

a. Belt Feed Lever Pivot. Unscrew the belt feed lever pivot screw. Remove the screw, shakeproof lockwasher, and belt feed lever pivot (fig. 45).

b. Belt Feed Lever. Withdraw the belt feed lever from its recess in the belt feed slide and remove lever (fig. 46).

c. Belt Feed Slide. Remove the belt feed slide from the cover.

d. Cover Extractor Spring. With the thumb, press down on the locking end of the cover extractor spring and guide it from its recess under the cover extractor cam. The spring must be held down with the thumb while being guided from its recess, because it is under compression.

18. Assembly of the Cover (M1919A6)

a. Cover Extractor Spring. Place the forked end of the cover extractor spring in the recess in its stud. Press down on the locking end of the spring, and when it is fully depressed, push the projection of the spring into the notch of the cover extractor cam.

b. Belt Feed Slide. Replace the belt feed slide in its grooves in the cover, making sure that the pawl is pointing to the right when the cover is assembled in the gun.

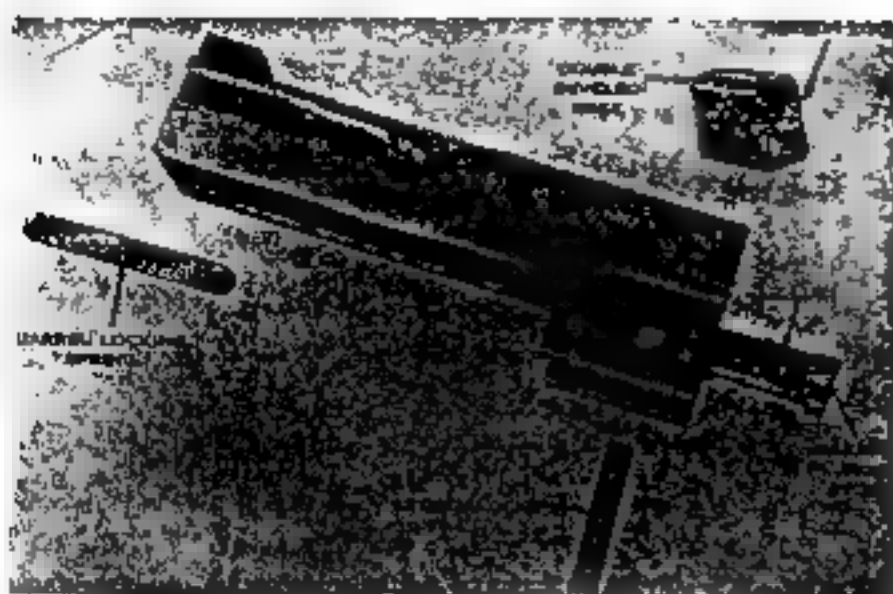


Figure 43. Barrel extension group.

c. *Belt Feed Lever.* Insert the rounded end of the belt feed lever through the slot in the cover and into its recess in the belt feed slide. Be sure the lever stud is away from the cover and to the rear. Position the pivot hole in the lever over the pivot hole in the bushing nut on the cover.

d. *Belt Feed Lever Pivot.* Insert the belt feed lever pivot in the top of the belt feed lever pivot bushing nut so that the pivot ex-

tends through the hole in the belt feed lever. Drop in the shakeproof lockwasher and screw in the belt feed lever pivot and screw until tight.

19. Disassembly and Assembly of Cover Group (M37 Machinegun) (fig. 47)

a. *Disassembly of Cover Group.* The cover is removed from the receiver only for detailed cleaning.

- (1) *Belt feed lever pin.* Using a small drift, drift out the belt feed lever spring pin and then remove the belt feed lever pin.
- (2) *Belt feed lever.* Lift out the belt feed lever, catching the belt feed lever plunger and spring.
- (3) *Belt feed lever plunger and spring.* Separate the plunger and spring from the belt feed lever.
- (4) *Belt feed slide.* Remove the belt feed slide from the guides in the cover.
- (5) *Belt feed pawl pin.* Drift out the belt feed pawl pin from the belt feed slide.
- (6) *Belt feed pawl.* Lift out the belt feed



Figure 44. Cover group, machinegun, M1919A6.



Figure 45. Removing belt feed lever pivot screw.

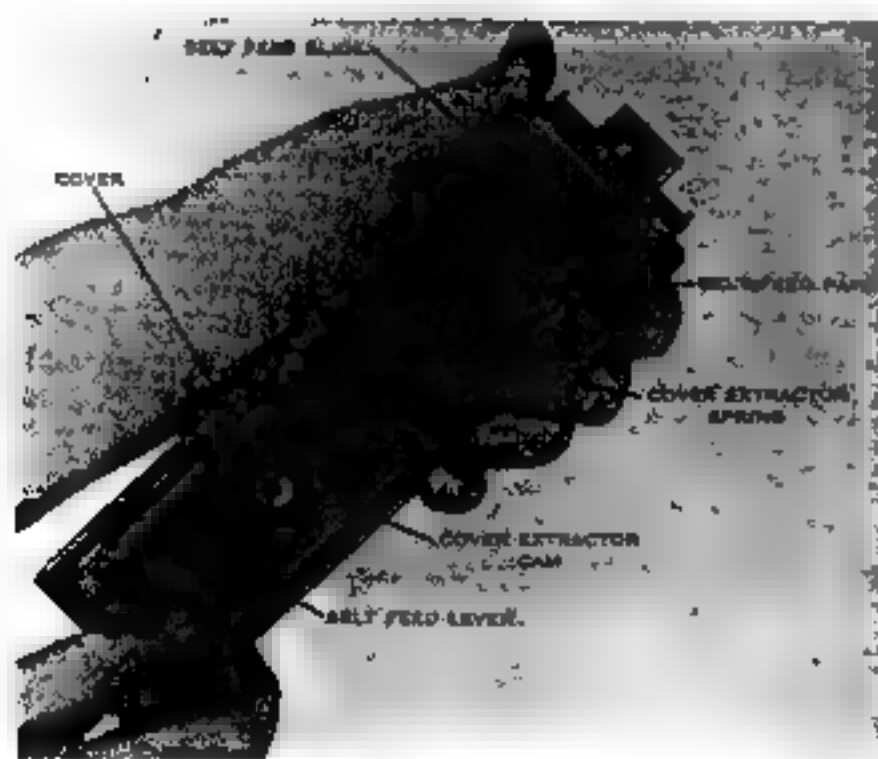


Figure 46. Remove belt feed lever

pawl, being careful not to lose the belt feed pawl spring

- (7) *Belt feed pawl spring.* Remove the belt feed pawl spring.
- (8) *Belt feed pawl arm.* Remove the belt feed pawl arm from the belt feed pawl.
- (9) *Cover latch spring.* Remove the cotter pin and lift out the cover latch spring.
- (10) *Cover extractor spring.* Slide the rear end of the cover extractor spring out from under the cover extractor cam, and lift the front of the spring from its stud in the cover.
- (11) *Cover.* To remove the cover from the receiver, first remove the cotter pin from the cover pin. Then drift

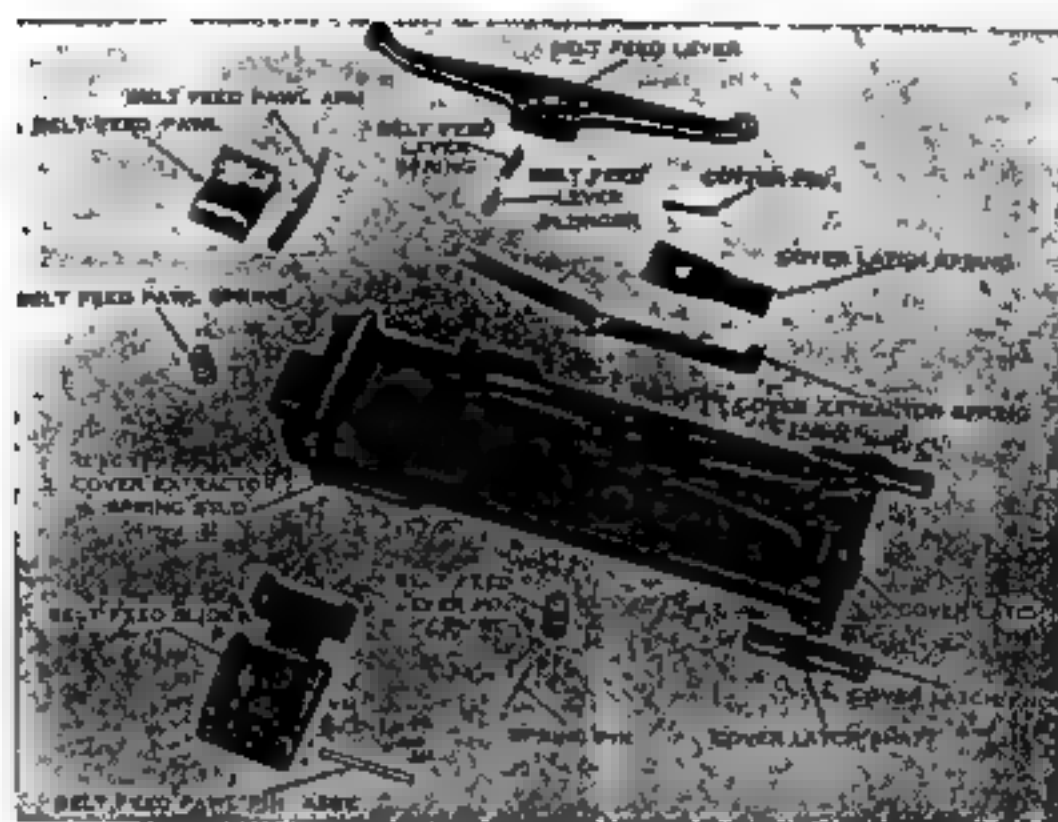


Figure 47. Disassembled cover group (M37 machinegun).

out the cover pin and remove the cover from the receiver. (The cover detent is not removed by the using unit.)

b. Assembly of Cover Group.

- (1) *Cover.* Aline the cover with the receiver and replace the cover pin. Then replace the cotter pin.
- (2) *Cover extractor spring.* Position the cover extractor spring on its stud; then engage the offset end of the spring under the cover extractor cam.
- (3) *Cover latch spring.* Replace the cover latch spring. Then replace the cotter pin.
- (4) *Belt feed pawl arm.* Replace the belt feed pawl arm on the belt feed pawl.
- (5) *Belt feed pawl spring.* Set the belt feed pawl spring in its proper position in the belt feed slide.
- (6) *Belt feed pawl.* Aline the belt feed pawl in the belt feed slide.
- (7) *Belt feed pawl pin.* Replace the belt feed pawl pin.
- (8) *Belt feed slide.* Replace the belt feed slide into the guides in the cover.
- (9) *Belt feed lever plunger and spring.* Replace the belt feed lever plunger and spring into the belt feed lever.
- (10) *Belt feed lever.* Replace the belt feed lever in its proper position in cover.
- (11) *Belt feed lever pin.* Replace the belt feed pin through the cover and belt feed lever. Then replace the belt feed lever spring pin.

20. Changing the Feeding Mechanism from Left-Hand Feed to Right-Hand Feed (M37 Machinegun)
(figs. 48 and 49)

- a. Change the bolt switches so that the right-hand belt feed cam groove is clear.
- b. Change the ejector from the right side to the left side of the extractor.
- c. Place the link stripper to the left side of the receiver
- d. Place the front cartridge stop to the left side of the receiver.
- e. Place the link chute to the left side of the receiver.
- f. Change the belt holding pawl and spring to the right side of the receiver.

CHAPTER 3

MOUNTS

22. General

a. The machinegun is provided with mounts that permit the gun to be fixed in both elevation and direction. This reduces the human error in firing, even when the firer is under the strain of excitement or fatigue. The fixed mount results in small dispersion and close grouping of fire. It permits limited overhead fire to be used without danger to friendly troops.

b. By virtue of the mount, machinegun fire is accurately and rapidly adjusted, and placed along a given line or into an area under all conditions of visibility, provided accurate firing data have first been obtained. This capability of the machinegun and mount is particularly useful in night firing, or when the target becomes hidden from view by rain, fog, or smoke.

23. Caliber .30 Machinegun Tripod Mount M2

a. *Description.* The M2 machinegun mount is composed of two main groups; the tripod group, and the elevating mechanism.

b. *Tripod Group (fig. 54).* The central member of this tripod is the tripod head. The gun pintle fits into the pintle bushing, which is located in the tripod head. It is locked into the bushing by means of the pintle lock. Two trail legs and one front leg extend from this tripod head. The rear legs are connected and additionally supported by a traversing bar. The traversing bar has an engraved scale to assist in measuring or establishing horizontal angles. This scale is divided into 100-mil major divisions and 5-mil subdivisions, up to 450 mils left and 425-430 mils right of zero. The traversing bar has sliding sleeve devices

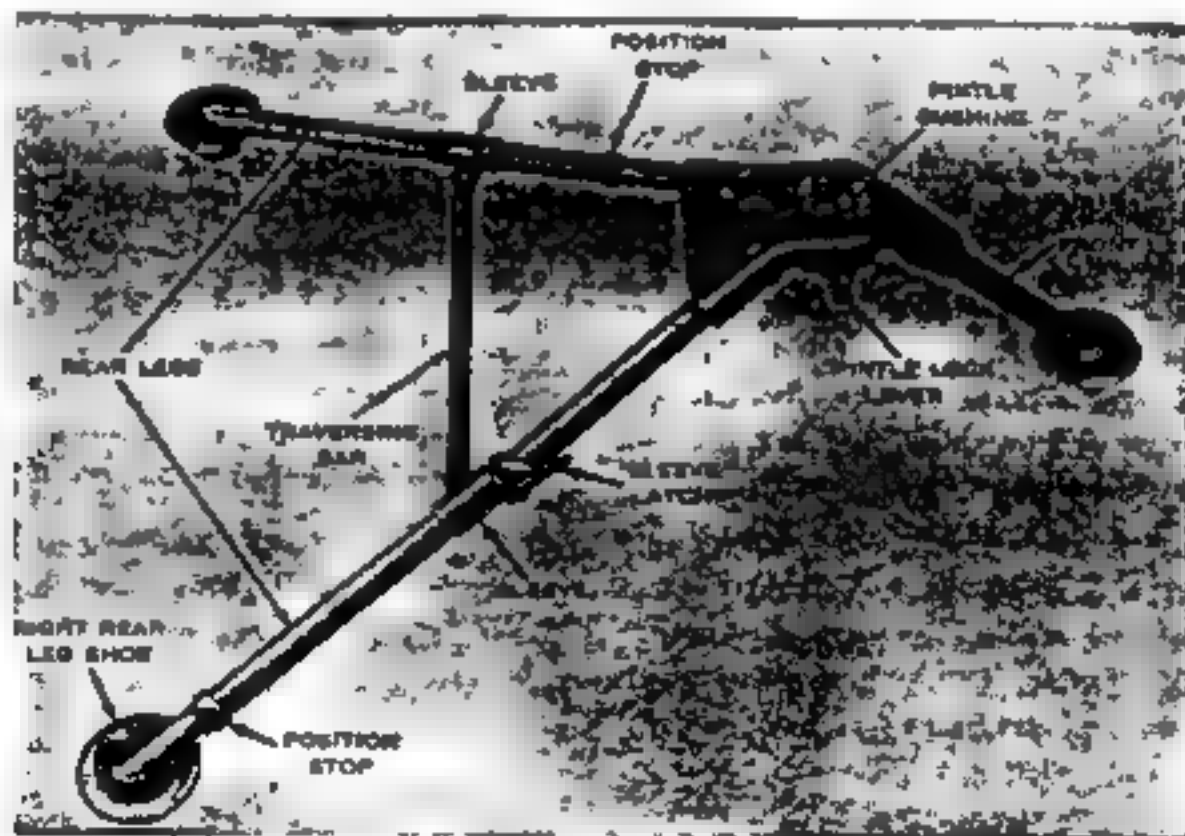


Figure 54. Machinegun mount M2, without elevating mechanism.

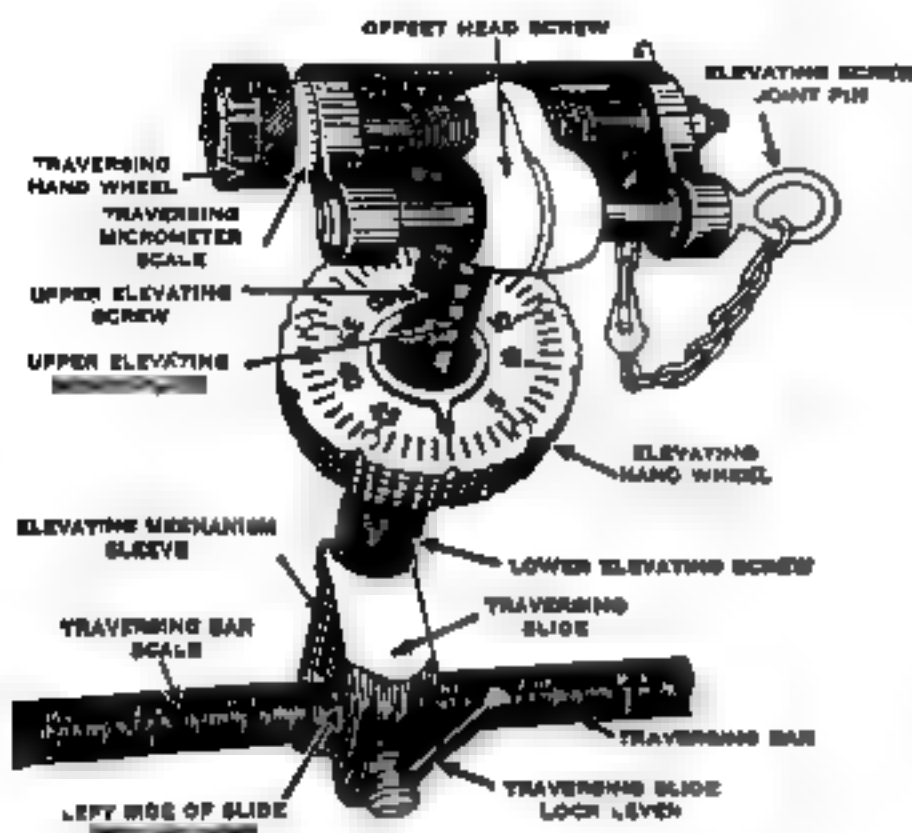


Figure 55. Traversing and elevating mechanism.

at each end to permit closing the trail legs. Position stops are provided to position the traversing bar in either the mounted or dismounted position. The traversing bar sleeve latch, mounted on the right trail leg, secures the traversing bar in its proper position when mounted.

c. *Traversing and Elevating Mechanism* (fig. 55). The elevating mechanism is secured to the mounting bracket on the receiver by means of the elevating screw joint pin and is seated in the base of the grip when the gun is not mounted on the tripod. The mechanism consists of three assemblies; the traversing screw assembly, the upper elevating screw assembly, and the lower elevating screw sleeve.

- (1) The traversing screw assembly is made up of an elevating screw yoke which supports the traversing screw, elevating screw joint pin, and the traversing handwheel. Both the traversing screw and the elevating screw joint pin pass through the top of the upper elevating screw assembly.
- (2) The upper elevating screw assembly

is threaded. It is made up of an offset head screw equipped with a longitudinal slot. The upper elevating screw scale plate is seated in this slot to indicate plus or minus increments of elevation of the gun. It is subdivided into 50-mil graduations from a center zero. The offset head of the screw has two recesses; one for the traversing screw and one for the elevating screw joint pin.

- (3) The lower elevating screw assembly consists of three subassemblies. The lower elevating screw is threaded internally to mate with the upper elevating screw, and is threaded externally to mate with the elevating mechanism sleeve. Secured to the top of the lower elevating screw is the elevating handwheel assembly. It is free turning and is threaded internally to mate with the the upper elevating screw. This elevating handwheel has a mil click device built into it. Engraved on the upper surface of the handwheel is a mil scale, which is read directly from the indicator. This 50-mil scale is divided into 5-mil major graduations and 1-mil subdivisions. The third subassembly is the sleeve and slide assembly. The slide fits onto the traversing bar, and is locked in position by means of the traversing slide lock lever. The left side of this traversing bar slide is used as an index when measuring or establishing horizontal angles. The elevating mechanism sleeve serves as a housing for the lower elevating screw.
- (4) The gun may be traversed up to approximately 50 mils by using the traversing handwheel, and up to approximately 875 mils by moving the traversing bar slide along the traversing bar. The controlled amount of elevation that can be obtained by using the elevating handwheel sub-



Figure 56. Pedestal mounted machinegun, caliber .30, M1919A6.



Figure 57. Truck mount M1919A6.

assembly is 400 mils, 200 mils above the zero graduation and 200 mils below.

24. Bipod Mount for the Machinegun M1919A6

The M1919A6 machinegun is equipped with a bipod leg assembly, which is attached to the front barrel bearing and is held in place by a lockring. The bipod leg tubes can be folded back along the barrel jacket or placed in a position at right angles to it. They are secured in position by the upper thumbscrews. Each tube has an extension which can be pulled out to raise the position of the muzzle and is secured by the lower thumbscrews. The bipod head rotates around the bearing so that the gun is not canted when it is mounted on a slope. Two fixed rest legs are attached to the bipod head and are exposed for use when the leg tubes are folded back against the barrel jacket.

25. Vehicular Mounts

Various types of mounts (figs. 56 and 57) are provided for use with vehicles. They con-

sist essentially of a cradle pintle and a pedestal body, and are semipermanently affixed to the vehicle.

CHAPTER 4

OPERATION AND FUNCTIONING

Section I. INTRODUCTION

26. General

In order to use the machinegun, it is necessary for the gunner to know how to correctly load, fire, unload, and clear the machinegun.

27. Half Loading

a. To half load a full belt with the cover closed, insert the metal tab of the belt into the feedway from the left. Pull the tab to the right until the first round is positioned to the right of the belt holding pawl. With the right hand, palm down and thumb along the forefinger, pull the bolt fully to the rear and release it. If the metal tab is not attached, insert the double looped end into the feedway first. Pull the bolt fully to the rear and release it.

b. To half load with the cover raised, position the initial round just to the right of the belt-holding pawl. Close the cover. Pull the bolt fully to the rear and release it.

28. Loading and Unloading

a. Loading is executed in the same manner

as half loading except that the bolt is twice pulled to the rear and released each time.

b. To unload, raise the cover, lift out the belt, close the cover, pull the bolt to the rear and release it, then raise the trigger.

29. Clearing the Gun

a. Raise the cover, remove the belt, pull the bolt to the rear and engage the extractor cam plunger in the notch in rear of the extractor feed cam. Check to see that there is no ammunition in the chamber or the T-slot. Do not lower the cover.

b. Additional precautions are taken during training when clearing the gun. After the steps above have been accomplished, a wooden block, which extends above and below the receiver approximately 1 inch, is inserted in the receiver between the bolt and the rear of the barrel. A cleaning rod is then inserted in the muzzle end of the barrel and pushed through the bore until it can be seen in the receiver and immediately removed. These precautions apply to field exercises and maneuvers as well as other types of training.

SECTION II. FUNCTIONING

30. General

a. By taking the machinegun apart and putting it together, the gunner becomes familiar with its parts. Next he learns how these parts function so he can reduce most stoppages that may occur. This knowledge also gives him confidence in his weapon, and enables him to keep it in working order.

b. The machinegun should function automatically as long as ammunition is placed in

the feedway and the trigger is held in the firing position. However, the first round must be loaded into the chamber manually

c. Each time a cartridge is fired, the parts inside the machinegun work in a given sequence. The movements are controlled by means of various springs, cams, and levers. This is known as the *cycle of operation*.

d. The *cycle of operation* is broken down

into eight basic steps. However, more than one step may occur at the same time. The steps are listed below in the order explained. They are—

- (1) *Feeding.* Feeding is the action of placing a cartridge in the receiver approximately in back of the barrel, ready for chambering.
- (2) *Chambering.* A new round is placed in the chamber.
- (3) *Locking.* The bolt is locked to the barrel and barrel extension.
- (4) *Firing.* The release of the firing pin and igniting of the primer of the cartridge.
- (5) *Unlocking.* The bolt unlocks from the barrel and barrel extension.
- (6) *Extracting.* The empty cartridge case is pulled from the chamber.
- (7) *Ejecting.* The empty cartridge case is ejected from the receiver.
- (8) *Cocking.* The firing pin is withdrawn into the cocked position.

a. With the Browning machinegun caliber .80, the recoiling groups must be manually operated to place the first round in the chamber. The cycle of operation begins with the first round positioned over the belt holding

pawl. The recoiling groups are in their forward position (fig. 58).

31. Feeding

a. First Phase.

- (1) Ammunition is fed into the gun by means of a metallic link belt. The belt feed mechanism is actuated by the bolt (fig. 59). When the bolt is in the forward position, the belt feed slide is within the receiver. The stud on the end of the belt feed lever is engaged in the cam groove in the top of the bolt.
- (2) As the bolt moves rearward during recoil, the belt feed lever is pivoted due to the action of the stud in the cam groove in the bolt. This causes the forward end of the belt feed lever to move the belt feed slide out of the left side of the receiver and over the metallic ammunition belt. The belt feed pawl then engages the next cartridge for feeding into the feedway (fig. 60).
- (3) The belt-holding pawl prevents the belt from dropping out of the feedway.
- (4) As the bolt moves forward, the belt

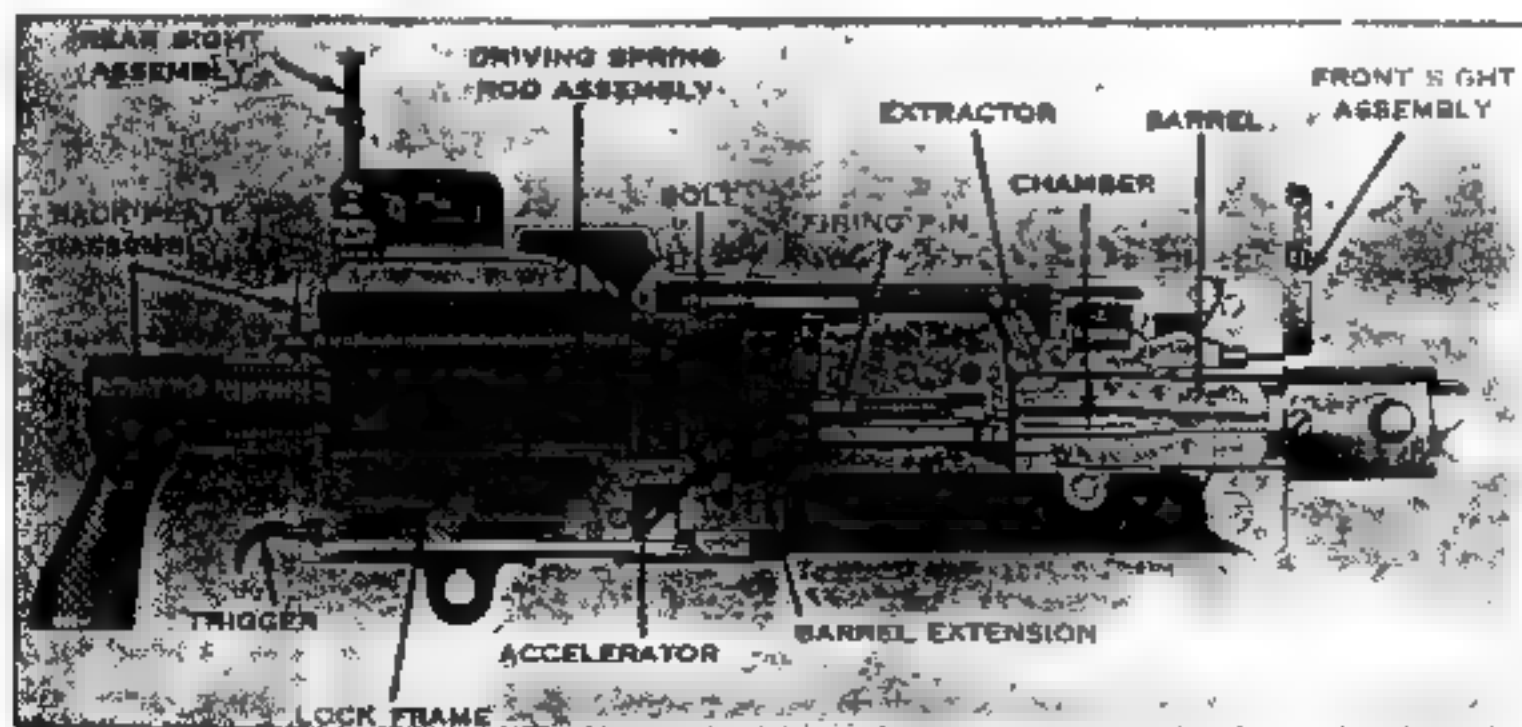


Figure 58. Machinegun, M1919A6, with moving parts in forward position (battery)

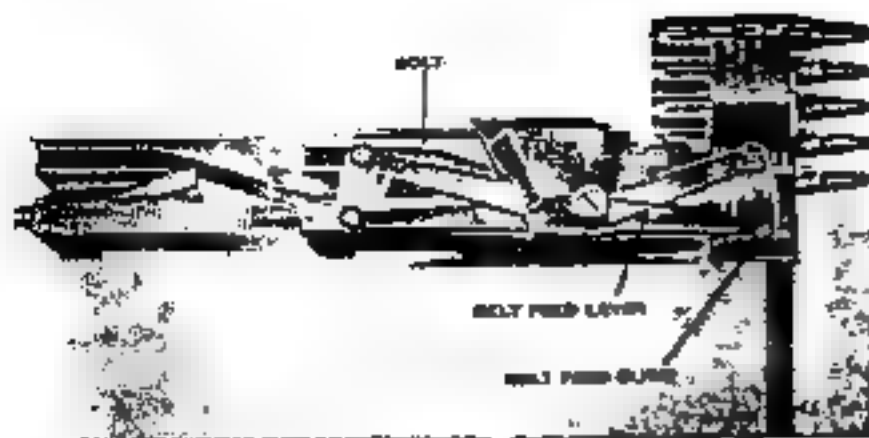


Figure 59. Action of belt feed lever.

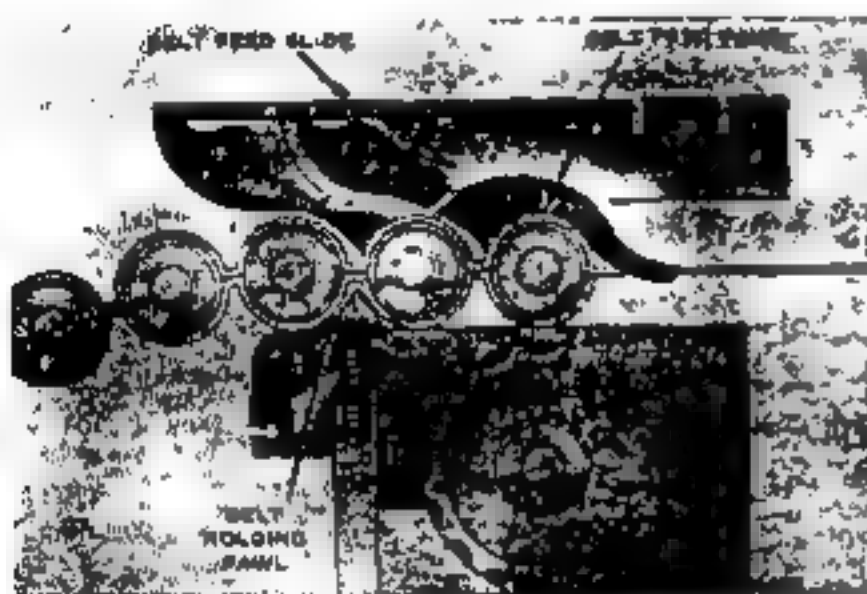


Figure 60. Action of belt feed and holding pawls.

feed lever is again pivoted in the cover. The belt feed pawl then places the cartridge against the cartridge stop in the feedway, positioning it so that it can be gripped by the extractor.

- (5) As the first cartridge is positioned against the cartridge stop, the second cartridge is carried over the belt-holding pawl that rises behind it and holds it in position to be engaged by the belt feed pawl in the next cycle (fig. 60). In the event the extractor fails to withdraw the leading round from the belt, the finger of the belt feed pawl, riding on top of this unextracted round, will hold the pawl in a raised position where it cannot engage in the next cartridge. Thus double feeding is impossible.

b. *Second Phase.* As the recoiling groups move to the rear, the extractor begins the removal of the round from the belt. The extractor which is pressed down by the cover extractor spring withdraws the new round from the belt when the bolt moves to the rear in recoil. The extractor is guided by the extractor feed cam. The extractor cam plunger is forced in by the beveled surface of the extractor feed cam and the extractor is forced down by the cover extractor cam (fig. 61). As the bolt starts to move forward the extractor cam plunger moves down under the ramp of the extractor feed cam and positions the cartridge in the T-slot in line with the chamber, completing the feeding phase.

32. Chambering

a. *First Phase* (fig. 62). After the extractor cam plunger clears the bottom of the extractor feed cam ramp and the bolt is moving forward, the new round with its base in the T-slot is held in line with the chamber by the extractor and ejector until the nose of the cartridge enters the chamber.

b. *Second Phase.* As the bolt continues forward, the extractor rises as the extractor cam plunger rides up on the extractor cam (fig. 61). As the extractor rises, the ejector is forced outward by the cartridge case into the half-moon recess of the barrel extension, and releases its hold on the cartridge case. The bolt moves to its forward position, fully seating the new round in the chamber. At the same time, the extractor rises over the extractor cam and, with the ejector, grips the next round in the belt.

33. Locking

As the bolt goes forward, the front of its lower projections strikes the accelerator, tripping it and rotating it forward (fig. 63). This disengages the barrel extension from the lock frame and releases the barrel plunger spring. The barrel extension and the barrel are pushed forward by the force of the bolt acting against the accelerator and by the expansion of the barrel plunger spring. As the recoiling groups move forward, the breech lock rides up on the

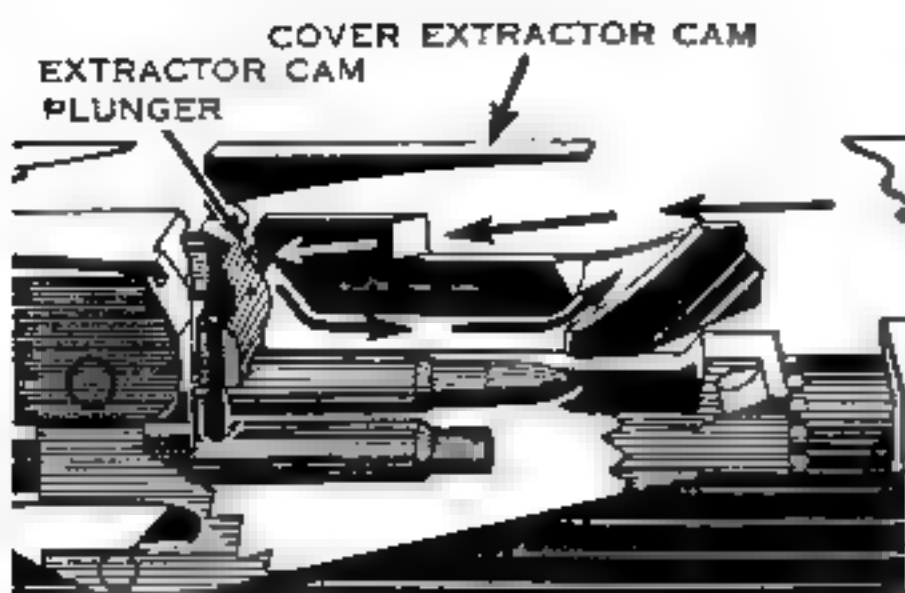


Figure 61. Path of extractor cam plunger.



Figure 62. Initial stage of chambering.

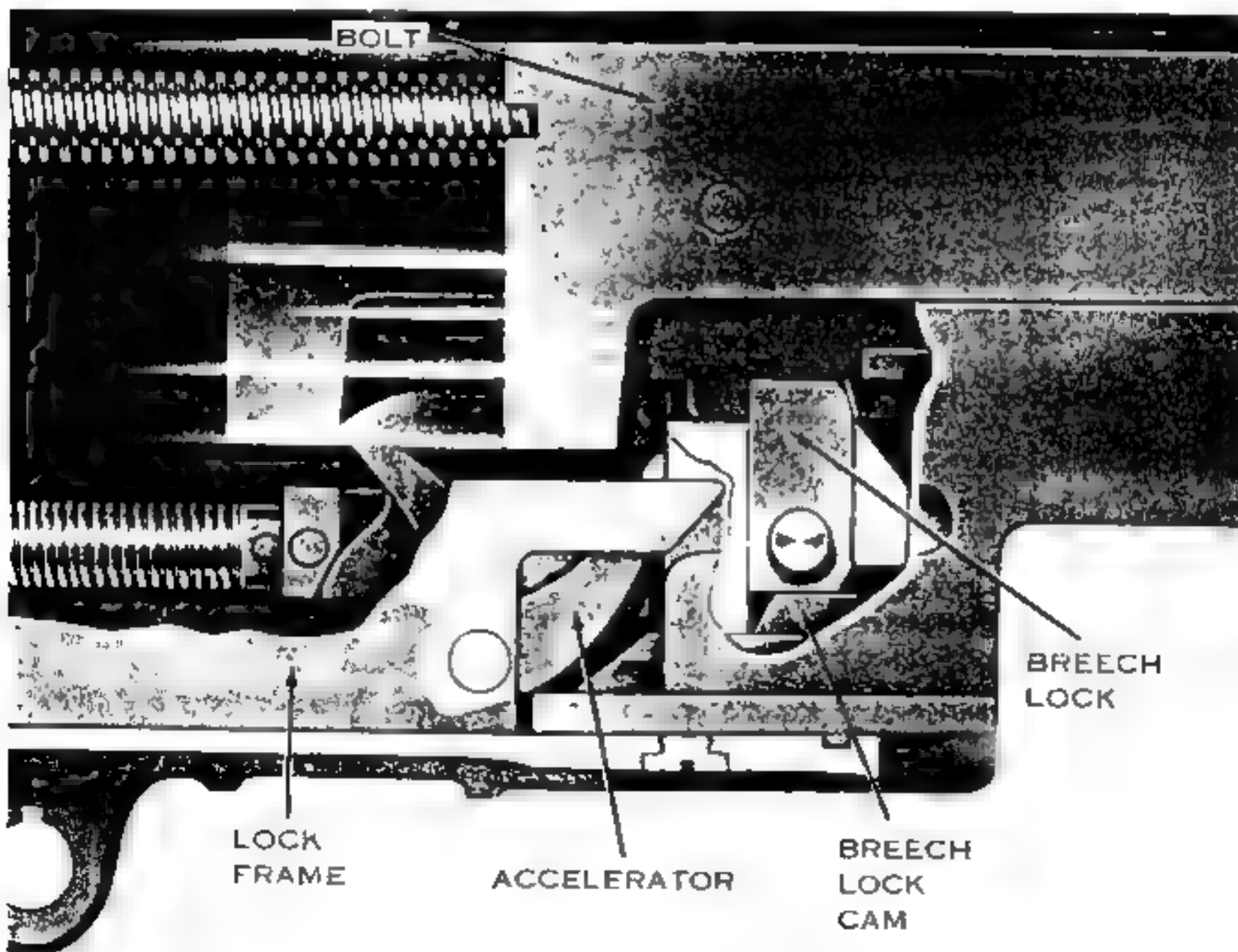


Figure 63. Accelerator action on the bolt.

breech lock cam into the breech lock recess in the bottom of the bolt. This locks the bolt firmly to the barrel and barrel extension, providing that correct headspace exists (para 10).

34. Firing First Shot

a. First Shot.

(1) The shoulder of the firing pin is engaged in the sear notch, the sear being held up by the action of the sear spring (fig. 64). The firing pin spring is held compressed between the sear spring pin and the firing pin spring pin. The trigger cams and the sear cams are engaged and are in position to release the firing pin when the trigger is raised.

(2) Since the trigger is pivoted, when the rear end is raised, the front end is lowered. The sear is forced down by the trigger cams through their engagement with the sear cams. The shoulder of the firing pin is released from the sear notch. The firing pin goes forward under the force of the expanding firing pin spring and strikes the primer of the cartridge (fig. 65).

b. *Automatic Firing.* If the trigger is held in the raised position, the trigger cams act against the sear cams each time the bolt moves forward, forcing the sear down and releasing the firing pin. The gun fires automatically, as long as the trigger is raised. The release of the firing pin takes place about one-sixteenth of an inch before the recoiling groups reach the forward position, but after the breech is locked.

35. Unlocking

a. First Phase (figs. 66 and 67).

(1) When the recoiling groups (bolt, barrel, and barrel extension) are in their forward position, the bolt is locked to the barrel extension and against the rear end of the barrel by the breech lock. Note in figure 66 that the breech lock is positioned on top of the breech lock cam and in the



Figure 64. Gun cocked and ready to fire.



Figure 65. Firing pin released.

breech lock recess in the bottom of the bolt.

(2) When the firing pin goes forward the cartridge is ignited. The force of the explosion drives the recoiling groups to the rear. During the first five-sixteenths of an inch of this movement, the groups are locked together. During the next five-sixteenths of an inch, the bolt becomes unlocked from the barrel extension and moves away from the rear of the barrel. This unlocking takes place when the breech lock rides down off the breech lock cam, being forced down by the breech lockpin, which has come in contact with the cammed surfaces on the front projections of the lock frame (fig. 67). This permits the bolt to move independently to the rear. The barrel and barrel extension move only a total distance of five-eighths of an inch to the rear.

b. Second Phase (fig. 68).

(1) When the rear end of the barrel ex-

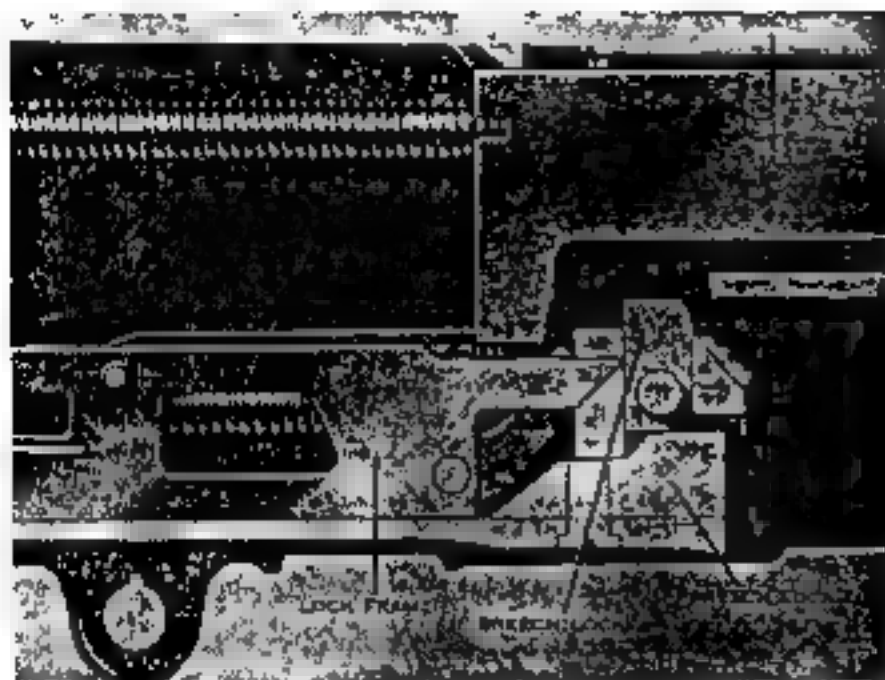


Figure 66. Breech lock engaged.

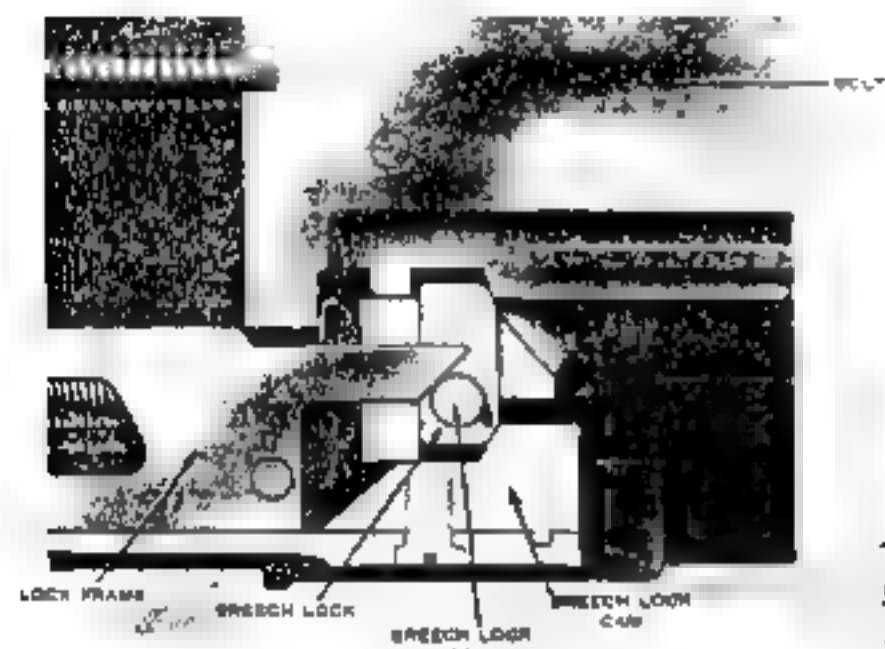


Figure 67. Breech lockpin coming in contact with the camming surfaces on the front projections of the lock frame.

tension strikes the accelerator, the accelerator rotates to the rear. As the accelerator rotates to the rear, its tips strike the lower projections of the bolt. This accelerates the movement of the bolt to the rear (fig. 68).

- (2) As the bolt moves back, the driving spring is compressed against its seat in the backplate, producing the energy that later drives the bolt forward. When the bolt reaches its rear-

most position, it strikes the buffer plate. This stops the rearward movement of the bolt, by absorbing the remaining momentum (fig. 69).

c. *Third Phase* (fig. 70). As the barrel extension moves to the rear, the barrel plunger spring is compressed by the barrel plunger stud acting against the barrel plunger; the energy produced later helps drive the barrel extension forward. The barrel plunger spring is held compressed by the claws of the accelerator which engages the T-lug and lock the barrel extension to the lock frame. The accelerator stop prevents the accelerator from turning too far to the rear.

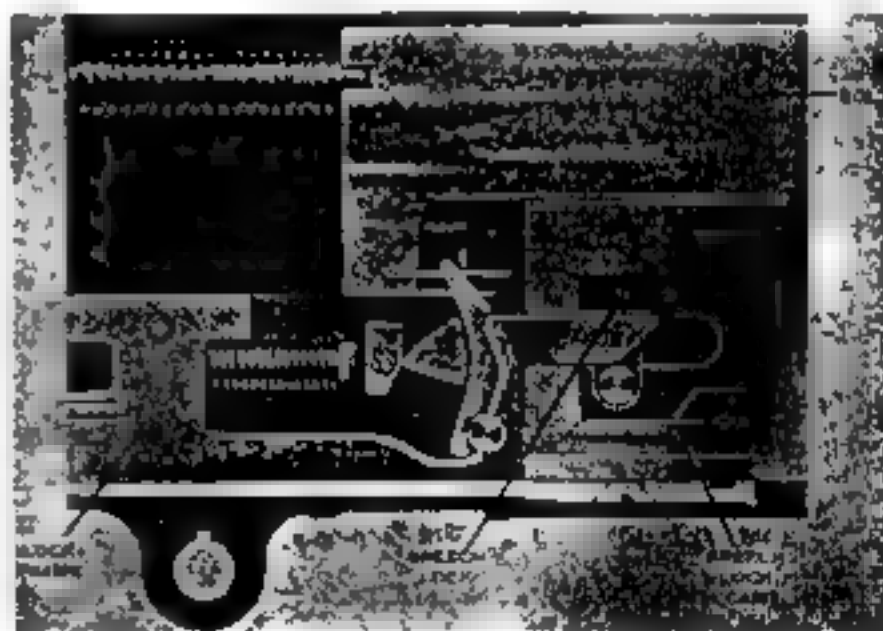


Figure 68. Breech lock in unlocked position, and action of the accelerator

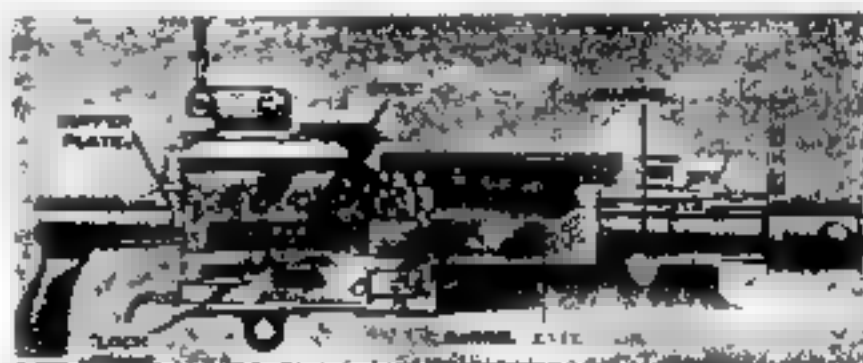


Figure 69. Recoil completed.

36. Extracting

As the bolt starts its independent rearward movement, the empty case held by the T-slot is withdrawn from the chamber (figs. 71 and 72).

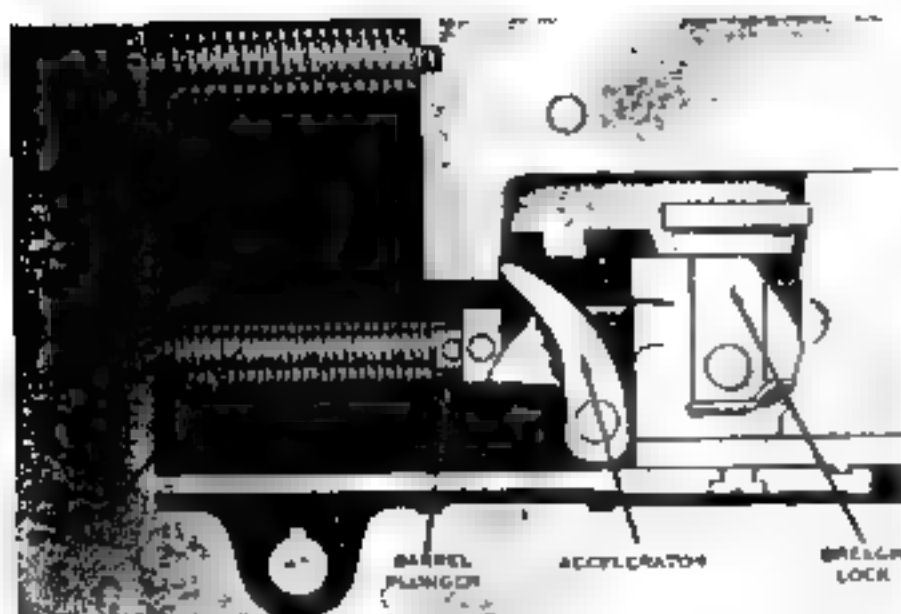


Figure 70. Barrel plunger spring compressed.

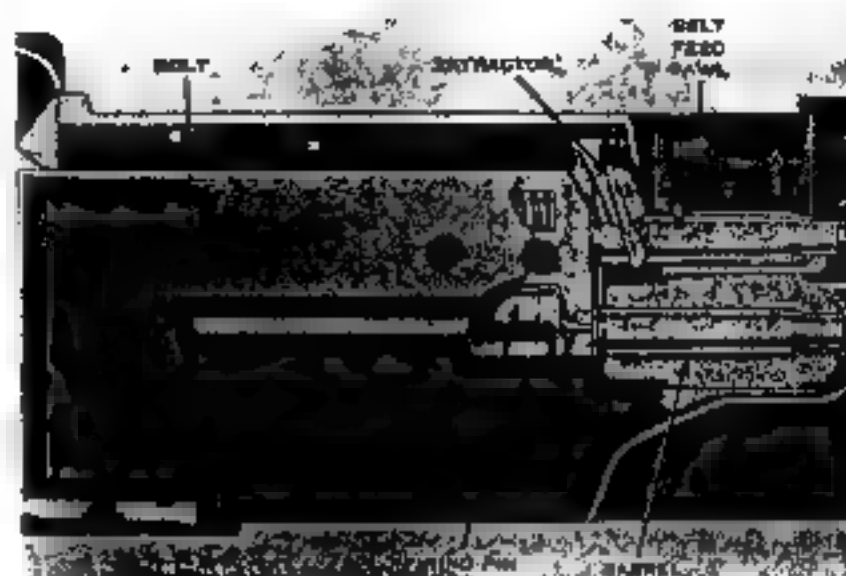


Figure 71. Extraction at the beginning of recoil.

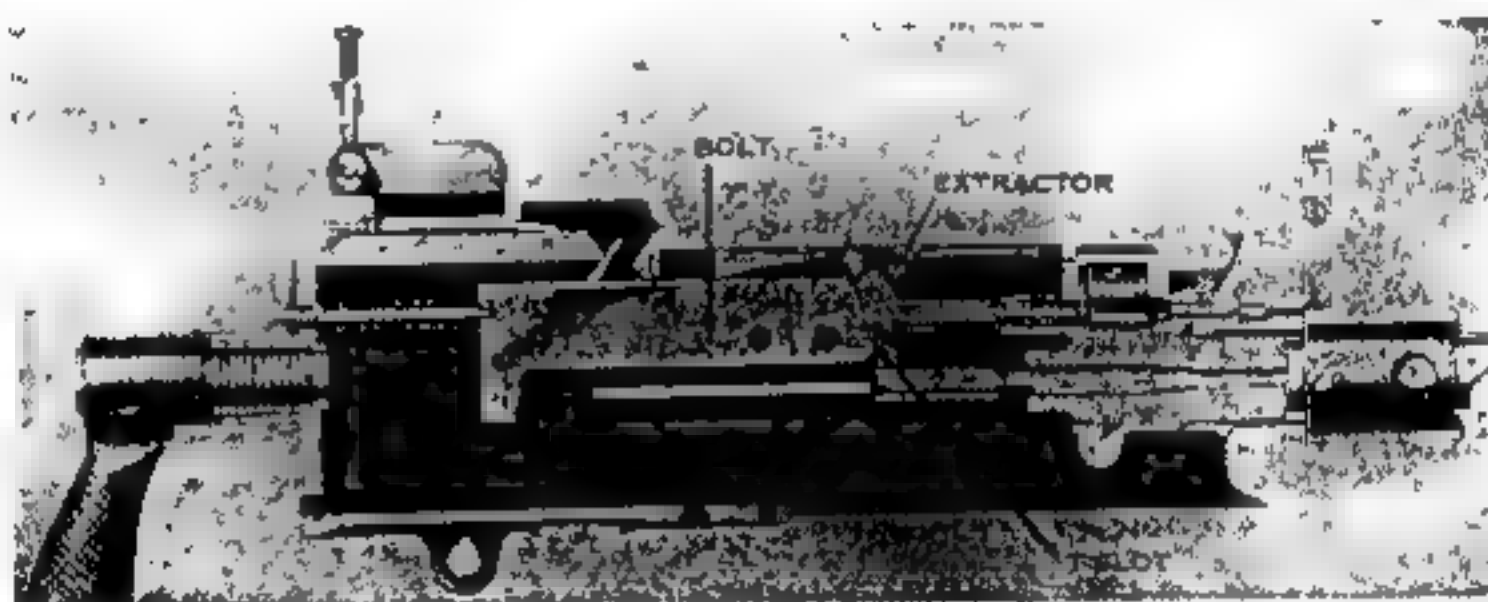


Figure 72. Extraction during recoil.

37. Ejecting

After the bolt reaches its rearmost position, it starts forward under the force of the driving spring. The extractor cam plunger, moving down behind the ramp on the extractor feed cam, carries with it the extractor, which forces the new round down into the T-slot. At the same time, if the empty case in the T-slot has not already fallen out, it is forced from the T slot by the tip of the ejector (fig. 61).

38. Cocking

a. The act of cocking the gun begins as the bolt moves to the rear. The top of the cocking

lever is rotated forward by engaging the cocking lever recess in the top plate (fig. 73). This brings the rounded nose of the cocking lever to the rear.

b. As the rounded nose of the cocking lever moves to the rear, it brings the firing pin with it. Thus the firing pin is withdrawn from the face of the bolt, and the firing pin spring is compressed against the sear spring pin.

c. The shoulder of the firing pin engages the notch in the sear, which, freed from the trigger cams, is pulled upward by the action of the sear spring. The shoulder of the firing pin, riding on the sear platform, prevents the sear from

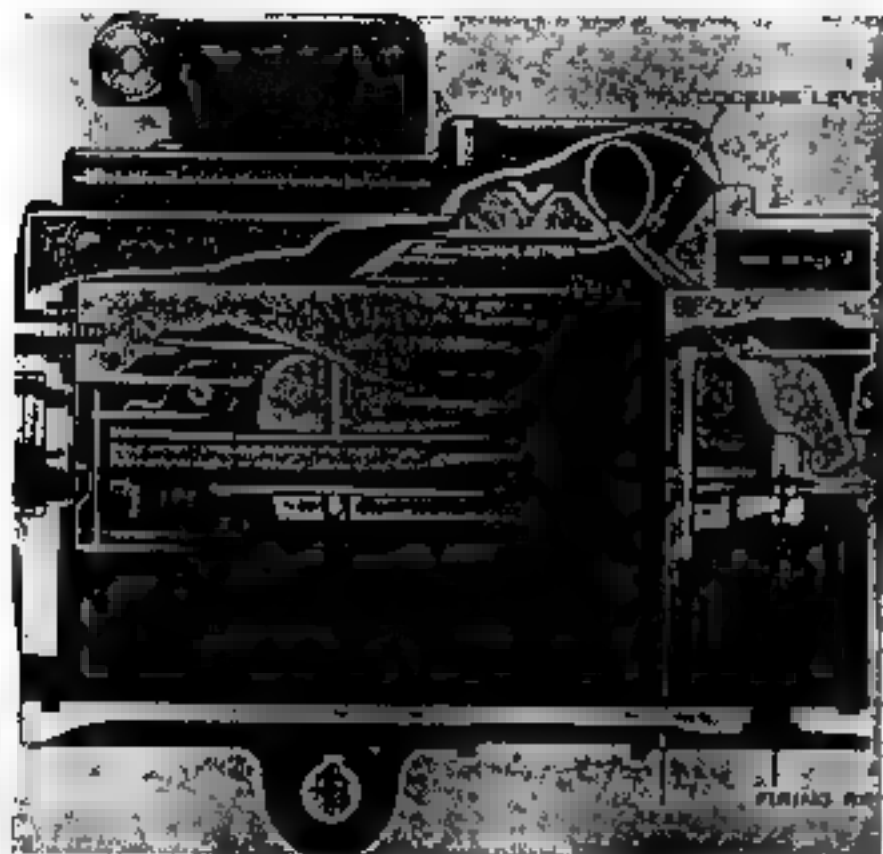


Figure 73. Cocking action during recoil.

rising until the shoulder is directly over the sear notch.

d. As the bolt moves forward, the top of the cocking lever is rotated backward, causing the rounded nose to pivot forward, away from the rear of the firing pin. If the firing pin is prematurely released by the sear, it is reengaged by the rounded nose of the cocking lever and eased forward so that the striker cannot contact the cartridge primer until after the bolt is locked to the barrel and barrel extension.

CHAPTER 5

MALFUNCTIONS, STOPPAGES, IMMEDIATE
ACTION, MAINTENANCE, AND DESTRUCTION

Section I. MALFUNCTIONS, STOPPAGES, AND IMMEDIATE ACTION

39. Malfunctions

A malfunction is a failure of the gun to function satisfactorily. Defective ammunition and improper operation of the gun by a crewmember are not considered malfunctions of the gun. The more common malfunctions of the caliber .80 machinegun are sluggish operation and a runaway gun.

a. Sluggish Operation and Corrective Action. Sluggish operation of the gun is usually due to excessive friction caused by dirt or carbon, lack of proper lubrication, burred parts, or incorrect headspace adjustment.

CORRECTIVE ACTION: Clean and lubricate the gun. Inspect thoroughly for burred parts (replace parts as necessary), and adjust headspace.

b. Runaway Gun and Corrective Action. A runaway gun is one that begins to fire as soon as it is loaded, or continues to fire when the trigger is released. This is caused by a defective trigger mechanism, worn sear notch, or worn firing pin shoulders.

CORRECTIVE ACTION: *Hold the fire on the target until feeding is stopped, or the ammunition is expended.* The best method of stopping the gun depends on the amount of ammunition remaining in the belt. If only a few rounds remain in the belt, allow them to be fired off. When a long belt of ammunition is in the weapon, the gunner or assistant gunner can stop the firing by—

- (1) Twisting the belt to stop the feeding.
- (2) Raising the cover, thus stopping the feeding action.

Note. Disassemble the gun after it ceases to fire and check the trigger mechanism, sear notch, and firing pin shoulders. Replace parts as necessary.

40. Stoppages

a. A stoppage is any interruption in the cycle of functioning caused by the faulty action of the gun or of the ammunition. Stoppages are classified by their relationship to the cycle of functioning. Table III shows the types of stoppages, their probable causes, and corrective actions to be taken.

Table III. Malfunctions and Stoppages

Malfunction or stoppage		Corrective action
Failure to feed.....	Defective ammunition belt. Defective feed mechanism. Defective extractor. Improperly loaded belt. Short round.	Replace necessary parts, reload belt.
Failure to chamber.....	Broken parts..... Obstruction in T-slot or chamber. Separated (ruptured) case. Thick or thin cartridge rim. Bulged round. Set back primer.	Replace necessary parts or defective ammunition.

Table III. Malfunctions and Stoppages—Continued

Malfunction or stoppage	Probable cause	Corrective action
Failure to lock.....	Incorrect headspace adjustment..... Broken parts. Battered breech lock. Rough breech lock cam. Faulty breech lock cam adjustment.	Adjust headspace, replace defective parts, or turn gun in for repair.
Failure to fire.....	Defective parts in firing mechanism..... Defective ammunition.	Replace necessary parts or ammunition
Failure to unlock.....	Broken parts in receiver..... Worn breech lock cam. Faulty breech lock cam adjustment.	Replace necessary parts, or turn gun in for repair.
Failure to extract.....	Dirty chamber..... Defective cartridge case.	Clean chamber, or replace necessary ammunition.
Failure to eject.....	Defective extractor cam plunger..... Defective ejector. Buried T-slot.	Replace necessary parts.
Failure to cock.....	Broken sear..... Worn sear notch. Worn firing pin shoulder. Weak sear spring. Broken cocking lever.	Replace necessary parts.
Runaway gun.....	Defective sear notch, trigger mechanism, or firing pin shoulders.	Replace necessary parts.
Sluggish operation.....	Excessive friction.....	Clean and lubricate, or adjust headspace.

b. Some defective parts can be replaced using spare parts which are issued with each gun; other parts will require that the gun be turned into ordnance for repair.

41. Immediate Action

Immediate action is the action taken to reduce a stoppage without investigating the cause. This action must be accomplished within 10 seconds (including waiting time) when the barrel is hot enough to cause a cookoff. One hundred and fifty rounds fired in a two-minute period may heat the barrel sufficiently to cause a cookoff.

a. If a stoppage occurs first, wait five seconds (in case of a hang fire), and then pull the bolt to the rear and release it, re-lay and attempt to fire. If the gun still fails to fire, note the position of the bolt handle.

- (1) If the bolt handle is forward, tap the cover, support the belt with the left hand at the point where the cartridges enter the feedway, simultaneously pull the bolt to the rear twice and release it each time. If the belt

feeds, re-lay and attempt to fire. If the belt does not feed, wait five minutes (in case of a cookoff), then raise the cover, remove the first round from the belt, inspect the chamber, close the cover, reload, re-lay and fire. If the gun still fails to fire, examine the gun, eliminate the cause, reload, re-lay and fire.

- (2) If the bolt handle is not forward, pull the bolt to the rear and release it. If the bolt handle goes forward, re-lay and fire. If the bolt handle does not go forward, wait five minutes (in case of a cookoff) and then raise the cover, eliminate the cause, reload, re-lay and fire.

b. If the gun fails to fire after the application of immediate action, it is probable that the stoppage is an unusual type and requires a detailed inspection to determine its cause.

42. Tools Used in Reduction of Stoppages

The tools commonly used in the reduction of a stoppage are the Mark IV ruptured car-

tridge extractor, the combination wrench M6, and the cleaning rod.

a. *Ruptured Cartridge Extractor.* A separated (ruptured) cartridge case in the chamber prohibits the entrance of the next round. To remove a ruptured cartridge case, use the ruptured cartridge extractor as follows:

- (1) Pull the bolt handle to the rear.
- (2) Insert the nose of the ruptured cartridge extractor in the chamber, handle up; push it forward to seat it firmly in the separated case, and then pull back on the handle.
- (3) Remove the separated case from the ruptured cartridge extractor so that it is ready for use. To do this, unscrew the end of the ruptured cartridge extractor and remove the separated case. Replace the end of the ruptured cartridge extractor.

b. *Combination Wrench M6.* The combination wrench aids in removing a round that is stuck in the T-slot. To remove a round from the T-slot, pull the bolt fully to the rear and raise the extractor. If the round does not fall out, remove it with the combination wrench as follows:

- (1) If the round is above the bolt handle slot in the receiver, insert the screwdriver end of the wrench through the slot and under the rear end of the cartridge. Pry the cartridge up.
- (2) If the round is below the bolt handle slot, insert the screwdriver end of the combination wrench through the opening in the bottom of the receiver. Drive the cartridge and the extractor up and out of the T-slot.

c. *Cleaning Rod.* The cleaning rod is used to remove a cartridge case from the chamber that has not been extracted by the bolt. To remove a cartridge case, use the cleaning rod as follows:

- (1) With the bolt fully to the rear, remove the round that is engaged in the T-slot.
- (2) Grasp the cleaning rod about six inches from the handle, insert it into the muzzle, and force the case from the chamber.

Caution: Care should be taken not to damage the face of the bolt by striking it when the rod is pushed through the bore.

Section II. MAINTENANCE

43. General

a. Maintenance of the caliber .30 machinegun includes inspection, cleaning, and replacement of parts. Proper care, cleaning, and preservation of the machinegun is an essential part of the gunner's duties. More machineguns become unserviceable through lack of care and cleaning than for any other reason.

b. Due to the close fit of the working surfaces and the high speed at which the gun operates, all surfaces must be kept free from burrs, rust, dirt, and grease if the gun is to fire properly.

44. Cleaning Materials, Lubricants, and Rust Preventives

a. *Cleaning Materials.*

- (1) *Bore cleaner, cleaning compound solvent (CR)* is issued for cleaning the bore of the machinegun after firing. This material possesses rust-preventive properties and provides temporary protection against rust. Dry the bore and other components immediately after using it and apply a thin coat of lubricating oil, general purpose (PL Special).
- (2) *Water* is used for cleaning the bore of the machinegun when rifle bore cleaner is not available. Warm water is good, but warm soapy water is better. It is used to clean only the bore. After using soap and water, dry the bore and apply a thin coat of

lubricating oil, general purpose (PL Special).

- (3) *Drycleaning solvent* is a noncorrosive petroleum solvent used for removing grease or light rust-preventive compounds from weapons. Since drycleaning solvent is highly flammable, do not use it near an open flame. Smoking is prohibited where this solvent is used. Apply it with rag swabs to large parts and use it as a bath for all small parts. Clean all surfaces immediately after thoroughly drying them with clean rags and then apply oil. Volatile mineral spirits paint thinner may be used instead of drycleaning solvent.

b. Lubricants.

- (1) *Lubricating oil, general purpose (PL Special)* is a highly refined mineral lubricating oil containing a rust-preventive. It does not harden, but forms a relatively heavy film that resists the direct action of salt spray. These characteristics make it useful for coating all parts of the weapon before landing operations.
- (2) *Engine oil, SAE 10*, may be used

when the above oil cannot be obtained. In cold weather, any oil as heavy as this causes sluggish operation and may prevent the machinegun from functioning. This alternate oil does not possess the rust-preventive properties of PL Special. When engine oil is used, the weapon must be examined, cleaned, and oiled frequently.

45. Care and Cleaning of Guns Before, During, and After Firing

a. General. Before firing, take the following steps to insure the efficient functioning of the machinegun:

- (1) Disassemble the gun into its main groups.
- (2) Clean the bore and chamber but do not oil them.
- (3) Clean the remainder of the weapon thoroughly and apply a light coat of oil to all metal parts that do not come in contact with the ammunition.

b. Procedures to be Followed. The care and cleaning of the caliber .30 machinegun before, during, and after firing are discussed in table IV.

Table IV. Care and Cleaning of the Caliber .30 Machinegun

Parts	Before	During firing and temporary cessation	After
Bore.....	Make sure it is clean.....		Clean and lightly oil.
Moving parts.....	Oil and test for worn or broken parts. They should function without friction.	Lubricate the working parts. Observe the functioning of the gun to anticipate failure.	Inspect, clean, and oil.
Bolt locking (headspace) adjustment.	Check headspace adjustment and correct if necessary. Barrel locking spring should be engaged.	Check immediately if a separated case occurs and tighten if necessary.	Adjust headspace correctly. Examine barrel locking spring.
Rear sight and windage....	See that sight is clean and functions properly.	Keep properly set.....	Clean and oil.
Spare parts and tools.....	Clean and oil completely. Examine newly drawn parts.	Keep available.....	Check and replace damaged or missing parts. Clean and oil.

c. Special Cleaning after Firing.

- (1) *Bore.* The bore must be thoroughly cleaned no later than the evening of the day it is fired. For two consec-

utive days thereafter, check for evidence of fouling by running a clean patch through the bore and inspecting it. The bore should be lightly oiled

after each inspection. If water is used for cleaning, be sure to dry the bore and oil it after each cleaning.

- (2) *Carbon deposits.* During firing, hard carbon gradually accumulates in the front barrel bearing and flash hider. This carbon, if not removed, eventually causes the barrel to bind, and may cause the gun to cease functioning. When cleaning the gun, these parts should be inspected for carbon. To remove the carbon, use carbon removing compound (PC 111-A) by soaking and brushing. This process must be followed by the use of dry-cleaning solvent.

Warning: This is a corrosive liquid. If splashed on skin, wash off thoroughly with water for at least 20 minutes. Get medical attention.

If the bearing has been removed, adjust the headspace after replacing it.

46. Cleaning Weapons Received From Storage

a. Machineguns received from a depot or from a gun manufacturer are usually covered with a light rust-preventive compound. Guns, which have been stored for more than a year, may be covered with heavy rust-preventive compound. Thorough and careful degreasing is necessary to obtain proper performance of the machinegun.

b. Use drycleaning solvent or a volatile mineral spirits paint thinner to remove all traces of the compound or oil. Take particular care that recesses in which springs or plungers operate are thoroughly cleaned. Failure to do this may cause stoppages at normal temperature and will certainly cause stoppages when the rust-preventive compound congeals during cold weather. *After using the cleaning solvent, be sure to completely dry the gun and apply a thin coat of PL Special to all metal parts.*

47. Care and Cleaning Under Unusual Conditions

a. Care and Cleaning in Cold Climates.

- (1) It is necessary that the moving parts of the weapon are kept absolutely free from moisture. It has also been found that excess oil on the working parts solidifies and causes sluggish operation or complete failure.
- (2) Before firing in temperatures below 0° F, completely disassemble and clean all parts of the gun thoroughly and oil them by rubbing with a cloth dipped lightly into lubricating oil, weapons (LAW).
- (3) When the gun is brought indoors it should first be allowed to come to room temperature, then disassembled, wiped completely dry of all moisture that may have condensed on the cold metal surfaces, and thoroughly oiled with lubricating oil, semifluid.
- (4) If the gun has been fired, the bore should be immediately swabbed out with an oily patch and, when the weapon reaches room temperature, thoroughly cleaned and oiled as prescribed in paragraph 45c(1).

b. *Care and Cleaning in Tropical Climates.* In tropical climates where temperature and humidity are high, the weapon should be thoroughly inspected daily by general disassembly and, if necessary, by detailed disassembly of the groups. Care should be exercised to see that unexposed parts, as well as the surfaces, are kept clean and oiled.

c. Care and Cleaning in Hot, Dry Climates.

- (1) In hot dry climates, where sand and dust are apt to get into the mechanism and bore, the weapon should be wiped clean at least once daily. Groups are disassembled to facilitate thorough cleaning.
- (2) When the weapon is used under sandy conditions, lubricants are wiped from exposed and noncritical operating surfaces. This prevents sand from sticking to the lubricant and forming an abrasive which can damage the

- (3) Immediately after use in sandy terrain, the weapon is cleaned and lubricated with drycleaning solvent.
- (4) After handling, wipe the gun with a dry cloth to remove sweat and avoid rust.
- (5) During sand or dust storms, the gun is kept covered if possible. It is cleaned immediately after such storms.

48. Care and Cleaning of the Gun, and Ammunition and Accessories Following a CBR Attack

a. General. If a chemical, biological, or radiological attack is anticipated, or if contaminations from such attacks are encountered, the following action is taken: apply oil to all outer metal surfaces of the machinegun and acces-

sories. Do not apply oil to ammunition. If the weapon is not to be used, cover the weapon, accessories, and ammunition with a protective covering. Ammunition is kept in its containers as long as possible. After a CBR attack, determine by means of the detectors provided whether or not the equipment is contaminated.

b. Not Contaminated. If not contaminated, clean the equipment with rifle bore cleaner or drycleaning solvent before firing.

c. Contaminated. If contaminated, a complete suit of protective clothing, including protective gloves and a protective mask, must be worn during decontamination. If the weapon must be used immediately, clean those parts of the gun necessary to allow feeding and firing. Detailed information on decontamination is contained in FM 21-40, and TM 3-220.

Section III. DESTRUCTION OF MATERIEL TO PREVENT ENEMY USE

49. Principle Governing Destruction

Destruction of the machinegun and mount will be undertaken only when they are subject to capture or abandonment.

50. Methods of Destruction

a. Mechanical Means. Of the following two methods for the destruction of the gun, the first method is preferred.

(1) Method No. 1.

- (a) *Gun.* Field strip. Use the barrel as a sledge. Raise the cover until vertical; then drive the cover down toward the jacket. Deform and break the backplate. Deform the T-slot. Remove the firing pin from the bolt; place the striker in the face of the bolt and break it off by bending. Wedge the lock frame, rear end down, into the top of the receiver between the top plate and the extractor cam; place the chamber end of the barrel over the lock frame front projections and break the projections off. Insert the bar-

rel extension in the back of the receiver, allowing the T-lug to protrude; knock off the T-lug by striking it with the barrel at the side plate corners nearest the feedway.

- (b) *Tripod.* Leave the gun pintle on the tripod (by removing pintle bolt). Use the barrel as a sledge. Strike the sides of the pintle and deform it. Fold the rear legs, turn the mount over on its head, stand it on its folded rear legs, knock off the pintle latch lever, and deform the head assembly. Deform the folded rear legs.
- (c) *Bipod.* Use the barrel as a sledge to smash the bipod head and legs.
- (d) *Spare parts.* Destroy the bolt, barrel extension, and firing pins as in a above. Other parts are broken or deformed.
- (2) *Method No. 2.* Insert the bullet end of a complete round in the muzzle and bend the case slightly, enlarging the mouth of the case to permit pulling

out the bullet. Retain sufficient powder to cover the bottom of the case to a depth of approximately $\frac{1}{8}$ -inch, and spill the remainder. Reinsert the bullet in the case, point first. Chamber and fire this round with the reduced charge; the bullet will stick in the bore. Insert one complete round in the chamber, and fire it with a 30-foot lanyard. Use the best available cover,

as this means of destruction may be dangerous to the person destroying the weapon.

b. *Burning.* To destroy the weapon by burning, use a thermite grenade placed on the receiver, over the bolt, and with the cover resting on the grenade.

c. *Disposal.* Bury the disassembled weapon in suitable holes or dump parts into streams, mud, snow, sumps, or latrines.

CHAPTER 6

CREW TRAINING

Section I. INTRODUCTION

51. General

a. Crew training not only gives crewmembers training in the rudiments of machinegun operation; it also gives them confidence in their ability to put the machinegun into action with precision and speed. Rotation of duties during training insures that every member becomes well trained in the duties of each crew position. Precision is obtained by strict adherence to the specific procedures such as inspections before firing, the manner of handling the gun during training, and following the prescribed safety procedures. Speed is integrated into the training after precision has been developed. *Precision is never sacrificed for speed.*

b. Crew training is conducted during transition firing, and may be conducted concurrently during other courses of fire at the discretion of the unit commander. Crew training may also be conducted using linked dummy ammunition. It should be emphasized that the organization for crew training discussed in this chapter is designed as a means of training the crewmembers in the rudiments of machinegun operation. It is not the organization that must be employed in every tactical situation.

c. Crew training, as discussed here, involves the weapons squad leader and the crew of one machinegun (gunner, assistant gunner, and ammunition bearer). The crew may consist of only a gunner and an assistant gunner. When this is the case, the equipment the ammunition bearer would normally carry must be distributed between the gunner and the assistant gunner. The assistant gunner must then perform the duties listed for the ammunition bearer as well as his own.

d. All commands are given by the squad

leader. The gunner and assistant gunner repeat all commands. After the gun is mounted, the assistant gunner transmits all signals from the squad leader to the gunner, and from the gunner to the squad leader.

52. Crew Equipment

a. During crew training with the bipod and tripod mounted Browning machinegun, caliber .80, the equipment necessary to operate and maintain these weapons must be carried, as well as individual arms and equipment.

b. The following is a suggested division of the equipment among the crewmembers. This may be changed as the situation dictates.

Squad leader and crewmembers	Equipment
Squad leader.....	Binocular, compass.
Gunner.....	Machinegun, 1 box ammunition.
Assistant gunner.....	1 spare barrel, spare parts chest (containing traversing and elevating mechanism), 1 box ammunition.
Ammunition bearer...	M2 tripod mount, 2 boxes ammunition.

c. When an ammunition bearer is not available as a crewmember, the items of equipment he would normally carry must be distributed between the gunner and the assistant gunner.

53. Forming for Crew Training (Biped or Tripod Mounted)

The squad leader commands FORM FOR CREW TRAINING. The crew forms in column with 5 steps between men in the order—gunner, assistant gunner, and ammunition bearer; the gunner is five steps from and facing the squad leader. When the crewmembers reach their

correct positions, they assume the prone position. They are now ready for crew training (fig. 74).

54. Rotation of Duties During Crew Training

a. Duties are rotated during crew training to insure that each member learns all duties within the crew.

b. The command to rotate all personnel is **FALL OUT LEADER**. At this command each member of the crew rises, moves forward, and assumes a new duty. The squad leader becomes the ammunition bearer. The gunner moves for-

ward and becomes the squad leader, the assistant gunner becomes the gunner, and the ammunition bearer becomes the assistant gunner. If it is not desired to change the squad leader, the command **FALL OUT GUNNER** is given. At this command, the crewmembers rise, the gunner becomes the ammunition bearer, the assistant gunner becomes the gunner, and the ammunition bearer becomes the assistant gunner. When the crewmembers have assumed their new positions, they call out their new duties in order—**AMMUNITION BEARER, ASSISTANT GUNNER, GUNNER**.

Section II. CREW TRAINING—BIPOD MOUNTED GUN

55. Inspection of Equipment Before Firing

A thorough inspection of equipment is made at the beginning of each exercise. After the crew is formed for crew training, the squad leader commands **INSPECT EQUIPMENT BEFORE FIRING, BIPOD**. At this command

each crewmember inspects his equipment as explained in paragraphs 56 through 58.

56. Inspection by Gunner

a. The gunner first inspects his ammunition. He removes the ammunition belts from their



Figure 74. Crew in prone position formed for crew drill.

containers and insures that they are properly linked, free of dirt and corrosion, and that the double link or metal tab is up (ready for loading). He then carefully replaces the belts in their containers.

b. After inspecting his ammunition the gunner inspects the gun. To do this he—

- (1) Adjusts and inspects the bipod by loosening the bipod upper thumbscrews and clamps the leg tubes in the upright position; then loosens the bipod lower thumbscrews and insures that the extensions of the bipod legs work smoothly, and clamps them at the desired height (fig. 75).



Figure 75. Gunner lowering bipod legs.



Figure 76. Gunner checking chamber.

- (2) Raises the cover, pulls the bolt to the rear and locks it by engaging the extractor cam plunger in the notch in the rear of the extractor feed cam.
- (3) Checks the chamber to insure that it is clear (fig. 76).
- (4) Calls for and receives the cleaning rod and combination wrench from the assistant gunner, and insures that the barrel is not obstructed by inserting and withdrawing the cleaning rod (fig. 77).
- (5) Insures that the flash hider is positioned properly and the retaining clip assembly is engaged in the slots in the front barrel bearing and flash hider, and that the locking band is secured.
- (6) Insures the bipod lockring is positioned properly.
- (7) Checks the carrying handle to see that it can be positioned so it will not interfere during aiming and firing.
- (8) Raises the front sight post and insures that the front sight bracket body and blade are tight, then lowers it.
- (9) Releases the bolt allowing it to move all the way forward and lifts the trigger to see that the striker protrudes through the aperture in the face of the bolt after the firing pin is released.
- (10) Checks to see that all moving parts are lightly oiled and function without excessive friction.
- (11) Checks the headspace adjustment and, if necessary, makes the correct adjustment insuring that the barrel locking spring is seated in a notch in the barrel, and the extractor is down.

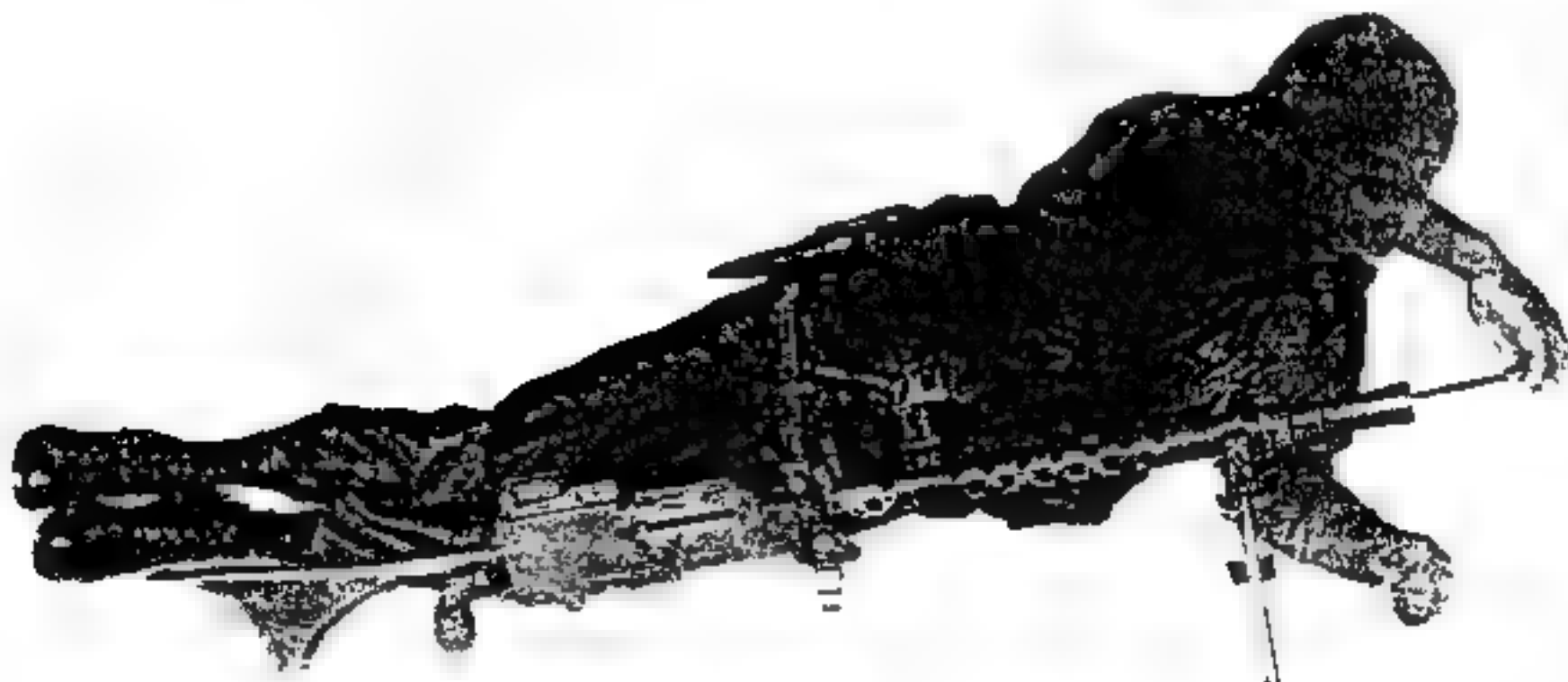


Figure 77. Gunner inspecting barrel.

- (12) Checks to see that the stud of the belt feed lever in the cover is to the left, and then lowers and latches the cover.
- (18) Checks the rear sight and insures that the windage scale is set at zero, the range setting is 600, and then lowers the sight.
- (14) Insures that the shoulder stock is properly positioned and the clamp wingnut is tight.
- (15) Returns the cleaning rod and combination wrench to the assistant gunner.

a. This completes the gunner's inspection of equipment. He now resumes his position parallel to the gun, with his head on line with the feedway.

57. Inspection of Equipment by Assistant Gunner

a. Remaining in the prone position, the assistant gunner begins his inspection by inspecting the ammunition as explained in paragraph 56a.

b. He removes the cleaning rod and combination wrench from the spare parts chest and assembles the cleaning rod. He gives these items to the gunner when requested.

c. Upon completion of his inspection of equipment, he remains in a prone position and reports as described in paragraph 59b.

58. Inspection of Ammunition by Ammunition Bearer

a. Remaining in the prone position, the ammunition bearer inspects his ammunition as explained in paragraph 56a.

b. Upon completion of his inspection of ammunition, he reports as described in paragraph 59a.

59. Reporting Completion of Inspection of Equipment

Upon completing the inspection of equipment, each member reports as follows:

a. Ammunition Bearer: **AMMUNITION BEARER CORRECT**, or he reports any deficiencies.

b. Assistant Gunner: **AMMUNITION BEARER AND ASSISTANT GUNNER CORRECT**, or he reports any deficiencies.

c. Gunner. **ALL CORRECT**, or he reports any deficiencies.

■ *1a. Discrepancies that cannot be corrected during the inspection are reported.*

60. Placing the Gun into Action

a. To place the gun into action, the squad leader commands and signals **GUN TO BE MOUNTED HERE** (pointing to the position where the gun is to be mounted), **FRONT** (pointing in the direction of fire), **ACTION** (vigorously pointing in the direction of the designated gun position).

b. At the command **ACTION**, the gunner rises to his feet, grasps the ammunition container with his left hand and the carrying handle of the weapon with his right hand, raises the gun to a carrying position with the muzzle to the front, and moves to the gun position (fig. 78).

c. On arrival at the gun position, the gunner places the gun on the ground and his ammunition container to the left of the feedway. He then assumes a prone position to the rear of the gun. He positions the carrying handle so it will not interfere during aiming and firing. He aligns the gun in the direction of fire and raises the sights.

d. The assistant gunner times himself so that he arrives at the gun position as the gunner is assuming the prone position. He places his ammunition container, spare parts chest, and spare barrel to the left of the gun. He then assumes a position to the left of the gunner lying on his left hip, feet to the rear. In this position he helps the gunner load the weapon and then removes the spare barrel from its case (fig. 79).

e. The ammunition bearer times himself so that he arrives at the gun position as the assistant gunner is assuming his position. He places the tripod one step to the left of the muzzle of the gun and on line with it, the head of the tripod away from the gun. He places his ammunition container next to the tripod legs, then assumes a prone position approximately

10 meters to the left and on line with the gun position and prepares to deliver fire into the target area with his individual weapon (fig. 80).

f. If the bipod legs need adjustment, the assistant gunner crawls forward and supports the muzzle of the gun by grasping the bipod rest legs with the left hand. He adjusts the height of the bipod with his right hand (fig. 81). The assistant gunner wears an asbestos mitten.

g. When ready to fire, the gunner reports UP. The assistant gunner signals READY to the squad leader (fig. 82).

61. Changing the Barrel

Practice in changing barrels and setting headspace may be included in crew training to insure speed and proficiency. The procedure is as follows:

a. The leader commands PREPARE FOR BARREL CHANGE. At this command, the gunner and assistant gunner perform the following actions:

- (1) The gunner clears the weapon as described in paragraph 29 and announces CLEAR to the assistant gunner.
- (2) The assistant gunner removes the flash hider assembly and announces UP to the squad leader.

b. When the squad leader receives UP from the assistant gunner, he commands CHANGE BARRELS. At this command, the assistant gunner unscrews the barrel from the barrel extension (using the M6 combination wrench) and slides it out of the barrel jacket. He then inserts the replacement barrel into the barrel jacket, screws it all the way into the barrel extension, and replaces the flash hider.

c. The gunner sets the correct headspace on the weapon as described in paragraph 10.

d. When headspace has been set and the weapon is loaded, the gunner assumes the correct position and grip and announces UP to the assistant gunner. The assistant gunner then signals READY to the squad leader.



Figure 78. Gunner moving to gun position.

62. Taking the Gun Out of Action

To take the gun out of action, the squad leader commands **OUT OF ACTION**. The gunner and assistant gunner repeat the command.

a. At the command **OUT OF ACTION**, the ammunition bearer moves to the gun position with his individual weapon slung. He secures the ammunition container, picks up the tripod, and returns to his original position approximately 15 steps to the rear of the gun position. He assumes the prone position with the tripod in front of him, tripod head to the left.

b. The assistant gunner places the spare barrel in its case, secures the spare parts chest, an ammunition container, and returns to his original position approximately 10 steps to the rear of the gun position and assumes the prone position.

c. The gunner places the shoulder stock on the ground, raises the gun cover, and removes the ammunition belt from the feedway. He then places the ammunition belt in the ammunition container and latches it. He inspects the chamber to see that it is empty, knocks down the extractor with his left hand, and insures that the belt feed lever stud is to the left. He then lowers and latches the cover, and lowers the front and rear sights. He clears the gun by pulling the bolt to the rear twice and releasing it each time, and then raises the trigger to release the firing pin. After clearing the gun, the gunner faces about and secures the ammunition container with his right hand and grasps the carrying handle of the gun with his left hand. He then rises and moves to his original position. On reaching his position, he visually checks to insure the ammunition bearer and the assistant gunner are in their



Figure 78. Gunner and assistant in position.



Figure 80. Ammunition bearer in position.

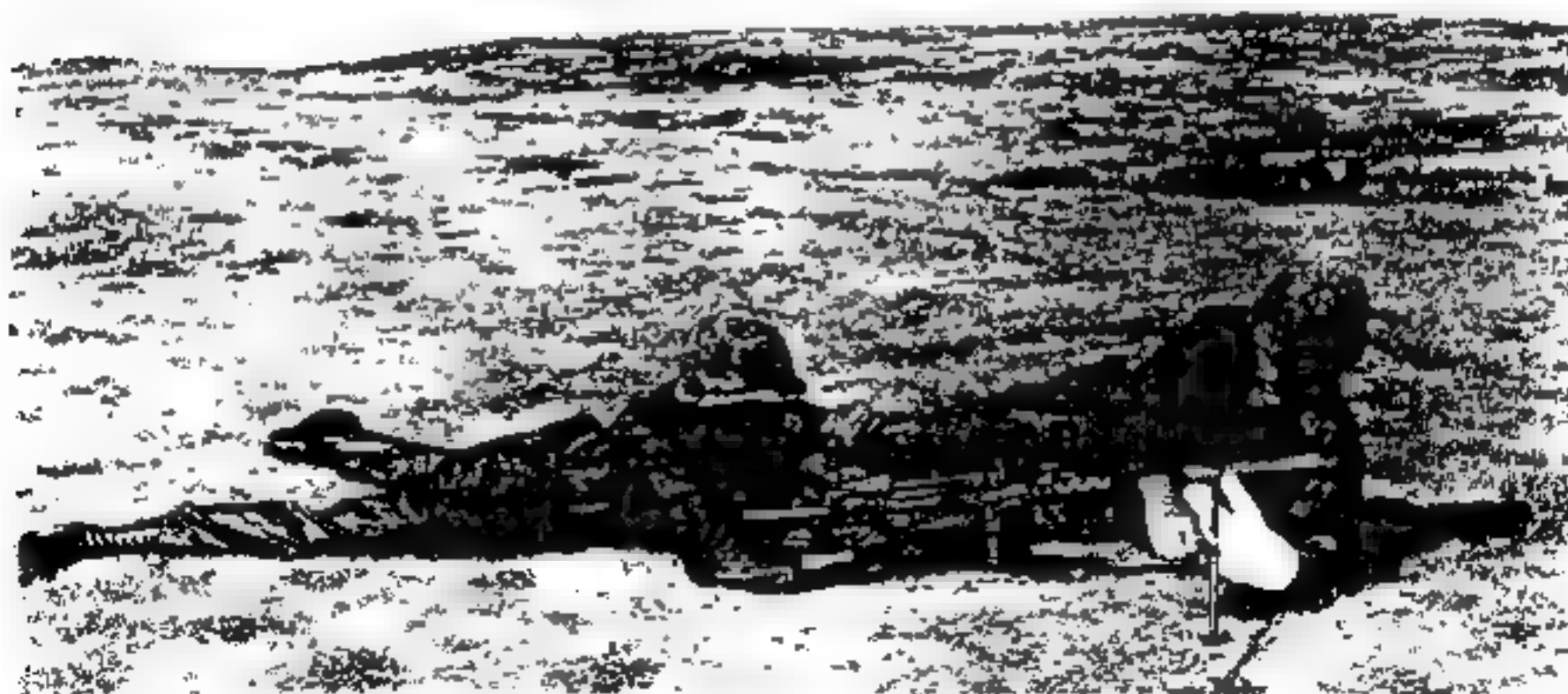


Figure 81. Assistant gunner adjusting bipod.



Figure 82. Crew ready to fire (bipod).

original positions. He assumes the prone position with the gun on his right and reports UP

to the squad leader. At this time a command may be given to rotate duties.

Section III. CREW TRAINING—TRIPOD MOUNTED GUN

63. Inspection of Equipment Before Firing

The inspection of equipment for tripod mounted training is the same as bipod mounted training with the following exceptions:

a. The squad leader's command to initiate inspection of equipment is — INSPECT EQUIPMENT BEFORE FIRING, TRIPOD.

b. After inspecting the bipod legs, the gunner returns them to their position along the sides of the barrel.

c. The assistant gunner removes the traversing and elevating mechanism from the spare parts chest and—

- (1) Rotates the elevating handwheel and exposes approximately 1½ inches of thread above the handwheel.

- (2) Rotates the elevating mechanism aleeve and exposes approximately 1½ inches of thread below the handwheel.

- (3) Rotates the traversing handwheel until an equal amount of thread is exposed on each side of the offset head screw.

- (4) Returns the traversing and elevating mechanism to the chest.

d. The assistant gunner then inspects the spare barrel and spare parts chest to see that—

- (1) The bore of the spare barrel is clear.
- (2) The front and rear bearing surfaces of the barrel are clean.
- (3) The contents of the spare parts chest are complete and serviceable.
- (4) The chest is closed and latched.

e. The ammunition bearer inspects the tripod to see that—

- (1) The tripod legs are closely folded.
- (2) The traversing bar sleeve latch has spring tension and will function.
- (8) The pintle lock lever is locked into the pintle bushing.

64. Placing the Gun Into Action

The squad leader commands and signals **GUN TO BE MOUNTED HERE, FRONT, ACTION** in the same manner as for the bipod training (para 60a).

a. At the command **ACTION**, the ammunition bearer grasps the tripod with his right hand, and the ammunition container with his left hand. He moves forward to the gun position, moving to the left of the assistant gunner and gunner. On arrival at the gun position, he places the ammunition container on the ground, kneels on his right knee, and rests the shoes of the rear tripod legs on the ground with the mount in a vertical position. Steadying the mount with his right hand near the tripod head, he raises the front leg with his left hand. He grasps the right shoe with his right hand and the left shoe with his left hand, and raises

the tripod chest high. He separates the tripod legs with a quick jerk (fig. 83). He insures that the sleeve latch engages the sleeve and then places the tripod on the ground with the front leg pointing in the direction of fire. He insures that none of the shoes are resting on stones or other hard objects. He rises to his feet, stamps the rear shoes into the ground, and then places his ammunition container on line with the front leg of the tripod and one step to the left. He moves approximately 10 meters to the left of the gun position, unslings his individual weapon, assumes a prone position, and prepares to deliver fire into the target area.

b. The assistant gunner times himself to arrive at the gun position as the ammunition bearer leaves it. He places the spare barrel, spare parts chest, and ammunition container to the left of the tripod. He then assumes a position to the left of the tripod, lying on his left hip, feet to the rear. He removes the traversing and elevating mechanism from the spare parts chest and the spare barrel from its case.

c. The gunner times himself to arrive at the gun position as the assistant gunner assumes his position. He secures the ammunition container in his left hand and grasps the carrying



Figure 83. Ammunition bearer opening tripod.

handle of the weapon with his right hand. Rising, he brings the gun to the carrying position, muzzle to the front, and moves forward to the gun position. Upon arrival at the gun position, he places the ammunition container to the left of the tripod. He then inserts the pintle into the pintle bushing in the tripod head and insures that the pintle lock mechanism has engaged the pintle, locking it securely to the tripod. (fig. 84). He assumes the prone position, then positions the carrying handle so it will not interfere during aiming and firing, and raises the rear sight.

d. The gunner swings the rear of the gun up and to his left. The assistant gunner hands him the traversing and elevating mechanism and steadies the rear of the gun. The gunner then positions and locks the traversing and elevating mechanism on the gun, and the slide on the traversing bar (fig. 85).

e. After the gun has been mounted, the assistant gunner helps the gunner load the weapon. The gunner then assumes the correct firing position and grip and reports UP. The assistant gunner signals READY to the squad leader (fig. 86).

65. Changing the Barrel

The same procedure described in paragraph 61 is used to provide practice in changing barrels and setting headspace.

66. Taking the Gun Out of Action

a. At the command OUT OF ACTION, the gunner raises the gun cover and the assistant gunner removes the ammunition belt from the feedway. The assistant gunner then places the ammunition belt in the ammunition container and latches it.



Figure 84. Gunner mounting the gun.

b. After the ammunition belt has been removed from the gun, the gunner performs the following actions:

- (1) Clears and checks the weapon as described in paragraph 29.
- (2) Raises the slide from the traversing bar and elevates the rear of the gun to the left which allows the assistant gunner to remove the traversing and elevating mechanism.
- (3) Raises the pintle lock lever with his right hand and lifts the gun from the mount by grasping the carrying handle with his left hand.
- (4) Pivots to the right without turning the gun.
- (5) Secures his ammunition container with his right hand and returns with the gun to his original position where he assumes the prone position.

c. After the assistant gunner has removed the traversing and elevating mechanism, he places it in the spare parts chest and closes

and latches the cover. He then secures the spare barrel, spare parts chest, and ammunition container, and returns to his original position where he assumes the prone position.

d. The ammunition bearer rises, slings his individual weapon, and approaches the gun position. He times his arrival so that when he has secured his ammunition container, the gunner and assistant gunner will be clear of the tripod. He grasps the tripod with his left hand and returns to his original position. On reaching his position, he places the ammunition container on the ground and kneels on his right knee. He then places the tripod in a vertical position with the rear shoes on the ground, supporting the tripod with his right hand near the head of the tripod. He reaches up with his left hand and lowers the front leg, slides his right hand down the right leg, and releases the traversing bar sleeve latch. He grasps the left leg near the shoe with the left hand and closes the left leg to the right (fig. 83). He lowers the tripod to the ground, head



Figure 25. Gunner attaching the traversing and elevating mechanism.

to the left, and assumes the prone position behind the tripod. Upon completion of this action, he reports UP.

e. When the gunner receives UP from the ammunition bearer and sees the assistant gunner is in his proper position, he reports UP to the squad leader. At this time a command may be given to rotate duties.

67. The Two-Man Carry

At times, the leader may wish to move the gun and tripod mount for short distances without dismounting the gun. This can be practiced during crew training in the following manner:

a. The squad leader commands UNLOAD and the gun is unloaded and cleared. The

ammunition belt is placed in the ammunition container.

b. The squad leader commands TWO-MAN CARRY, FOLLOW ME.

c. The gunner grasps the right rear leg with his right hand and the left rear leg with his left hand.

d. The assistant gunner grasps the carrying handle with his right hand and the ammunition container with his left hand.

e. The gunner reports UP when both men are ready to move.

f. Both men spring to their feet and follow the squad leader to the designated position.

g. The remainder of the equipment is carried by the ammunition bearer.



Figure 86. Crew ready to fire (tripod).

CHAPTER 7

TECHNIQUE OF FIRE DURING PERIODS OF LIMITED VISIBILITY

68. General

This chapter provides guidance in machine-gun firing techniques during periods of limited visibility. Periods of limited visibility refer not only to periods of darkness, but also to periods during daytime operations when visibility is impaired by conditions such as smoke, fog, rain, or snow.

69. Firing Techniques, Browning Caliber .30 Machineguns

The information and techniques described in paragraphs 102 through 111a, FM 23-57 apply to the caliber .30 machineguns with the exceptions described in a through d below.

a. Field expedients which aid in aligning sights to engage targets represented by muzzle flashes are shown in figure 87.

b. To obtain the maximum extent of grazing fire over level or uniformly sloping terrain of 600 meters, the gunner places the rear sight slide on a 600-yard sight setting. He then selects a point on the ground which he determines to be at a range of 600 meters. He lays, fires, and adjusts on this point. At no time will the center of the cone rise more than one meter above the ground.

c. The traversing and elevating mechanism for the caliber .30 machinegun is depicted in figure 55.

d. Laying the machinegun by the use of field expedients includes the use of stakes and other devices to engage preselected target areas. Proper use of one or a combination of the field expedient techniques described in this paragraph will aid the gunner considerably in employing the machinegun in its predetermined fire role. These techniques may be used in conjunction with the traversing bar and

traversing and elevating mechanism method. The field expedient method serves to supplement and enhance the employment of the gun in engaging preselected target areas. It is not as effective as the traversing bar and traversing and elevating mechanism method and requires additional material. Field expedients serve as a primary means of engaging preselected target areas in a secondary sector during periods of limited visibility. They may be used as a primary means in the primary sector until time or conditions of visibility permit recording data from the traversing bar and traversing and elevating mechanism. If a gun crew is replaced for any reason, the field expedients being employed must be explained to the relieving crew.

(1) *The base stake technique.* This technique is used to define sector limits. It may provide the lay for the final protective line or other preselected target areas which exist along a primary or secondary sector limit. The base stake method is effective during all conditions of visibility and requires a minimum of additional material. The following procedure is used to—

- (a) *Define a limit of sector.* Lay the gun for direction along one sector limit and emplace a stake along the outer edge of the folded bipod legs, taking up the "play" as the legs rotate slightly on the barrel. The same procedure is used for placing a stake along the opposite sector limit.
- (b) *Lay the gun to engage a final protective line.* Move the muzzle of the weapon to a limit of sector. Adjust for elevation by driving a stake into the ground so the top of the

stake is under the barrel jacket. Allow a few mils of depression to facilitate covering irregularities in the terrain (fig. 88).

(c) Lay the gun to engage other target areas on a sector limit. In a pri-

mary sector this is accomplished by using the procedure in (b) above, the only difference is that no depression is allowed for irregularities in the terrain. In a secondary sector with the gun mounted on the

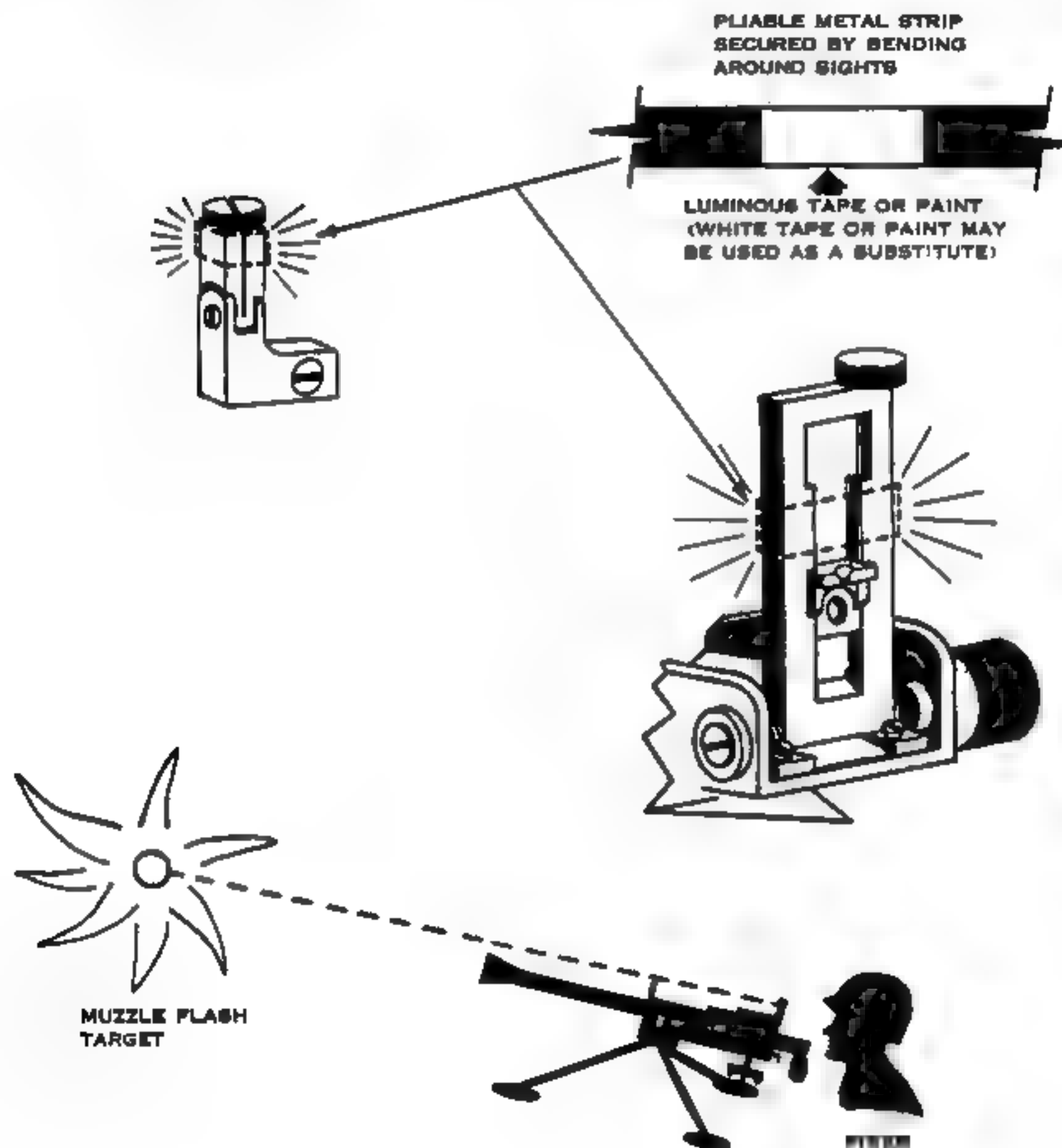


Figure 87. Field expedient night sight and sight picture for the machinegun, 1918A6.

tripod and the traversing and elevating mechanism removed, the procedure described in (a) above is used in addition to driving in an additional stake under the barrel jacket to fix the elevation (fig. 89).

- (2) *The notched stake or the tree crotch technique* (fig. 90). The notched stake or the tree crotch technique is used with the bipod mounted gun to engage preselected target areas within a sector, or to define sector limits. This method is effective during all conditions of visibility and requires a minimum of additional material.

To employ this method, the following procedure is used:

- (a) The shoulder stock of the weapon is placed in the rests of notched stakes, or tree crotches, and adjusted to hit desired targets or to define sector limits.
- (b) Shallow trenches or grooves are dug for the bipod feet. These trenches or grooves act as a pivot point for the weapon, permitting rotation of the bipod feet as the shoulder stock is moved from one crotch or stake to another.

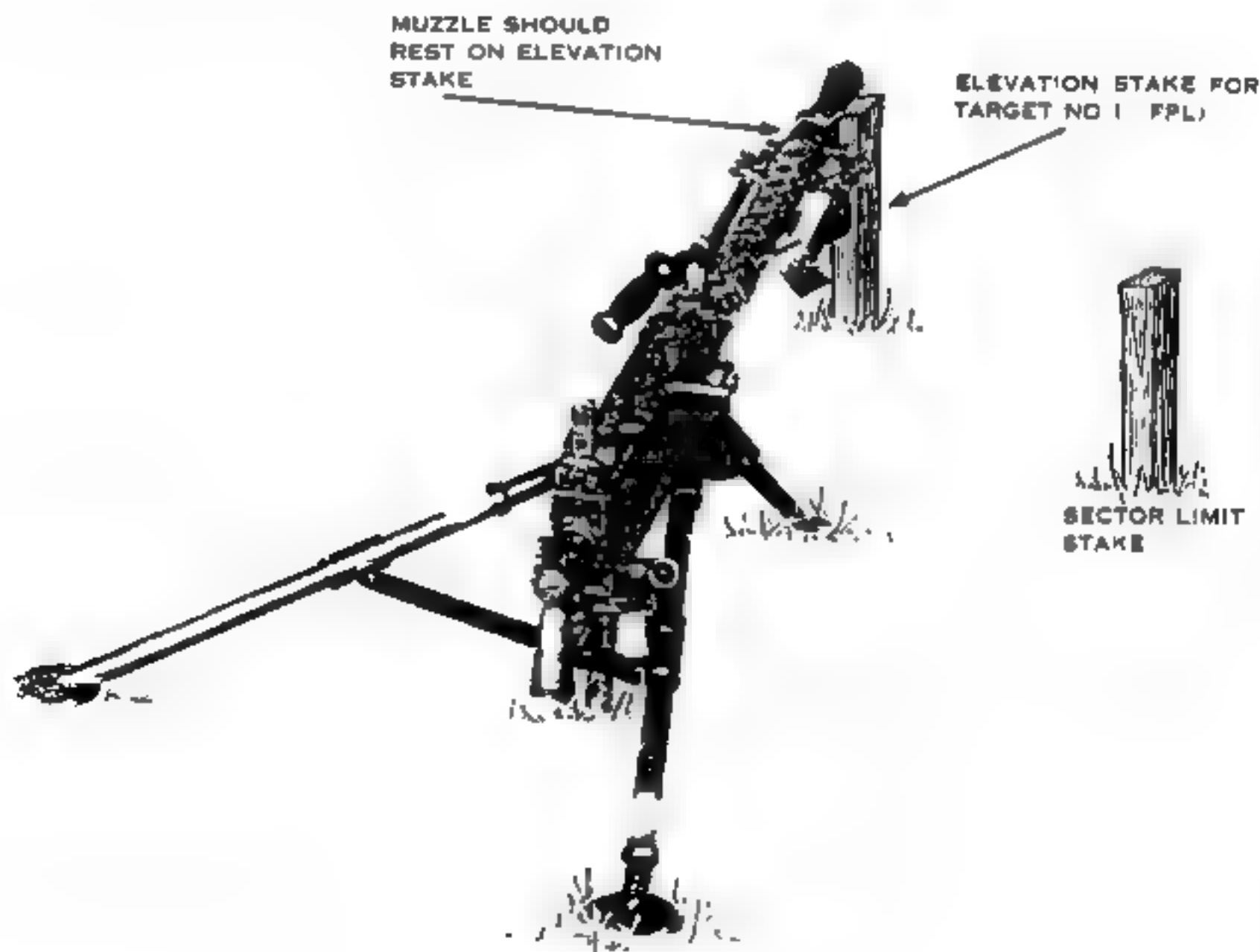


Figure 88. Base stakes for engaging the FPL and marking sector limit.

(c) The weapon is held and fired using the position and grip employed in bipod firing.

(8) *The horizontal log or board technique.* This technique is used with the bipod or tripod mounted machinegun to mark sector limits and provide sector of grazing fire. The horizontal log or board technique is effective during all conditions of visibility. The following procedures are used with—

(a) *The bipod mounted gun (fig. 91).* Place a log or board beneath the shoulder stock of the weapon in

such a way that the shoulder stock can slide across it freely. Dig shallow trenches or grooves for the bipod feet to allow rotation of the feet as the shoulder stock is moved along the horizontal log or board. Adjust the bipod legs to the desired elevation. The sector limits may be marked by notching, or placing stops on the horizontal log or board. The bipod firing position and grip are used.

(b) *The tripod mounted gun (fig. 92).* Place a log or board beneath the

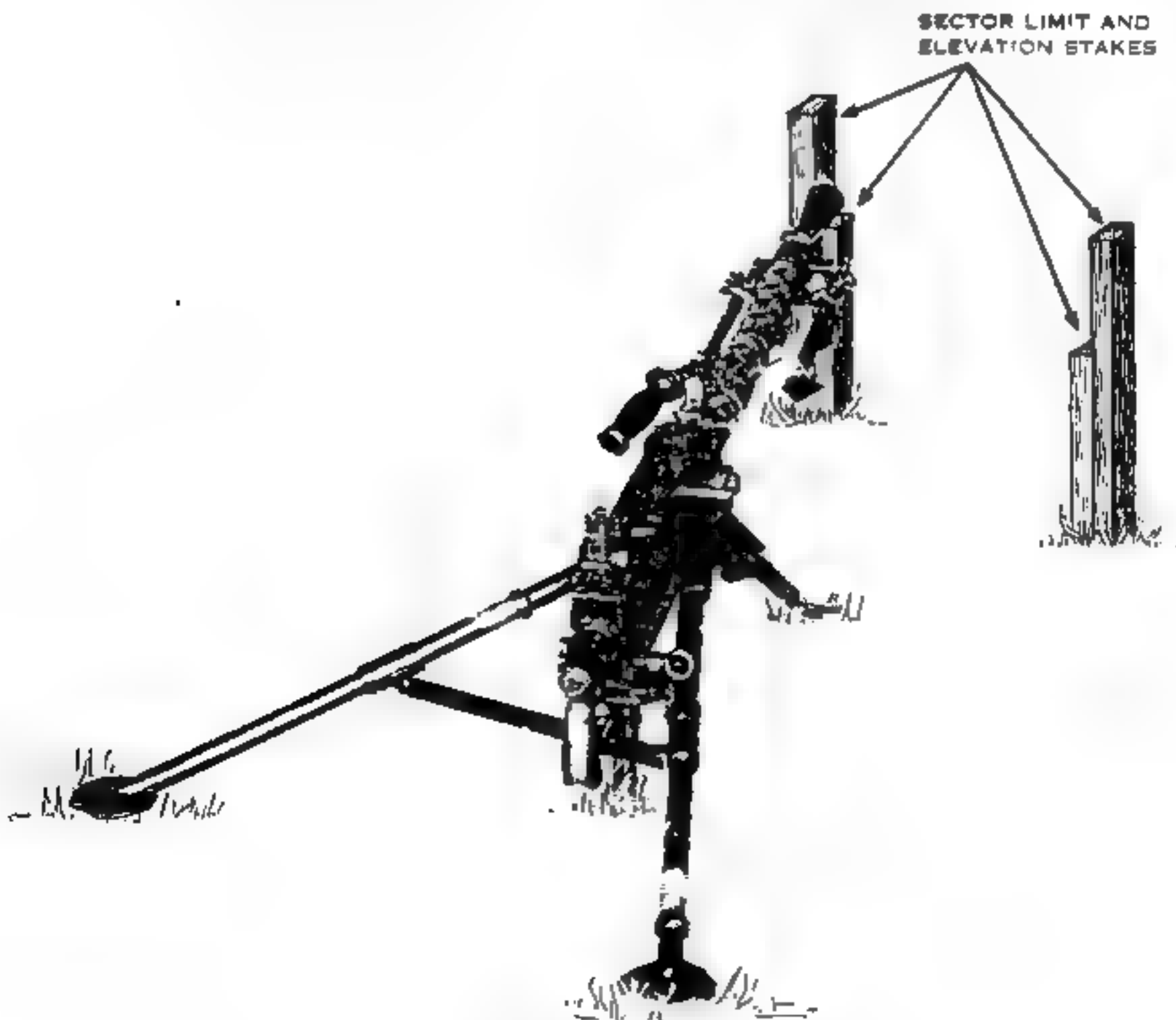


Figure 89. Base stakes for engaging target areas (other than FPL) on sector limits.

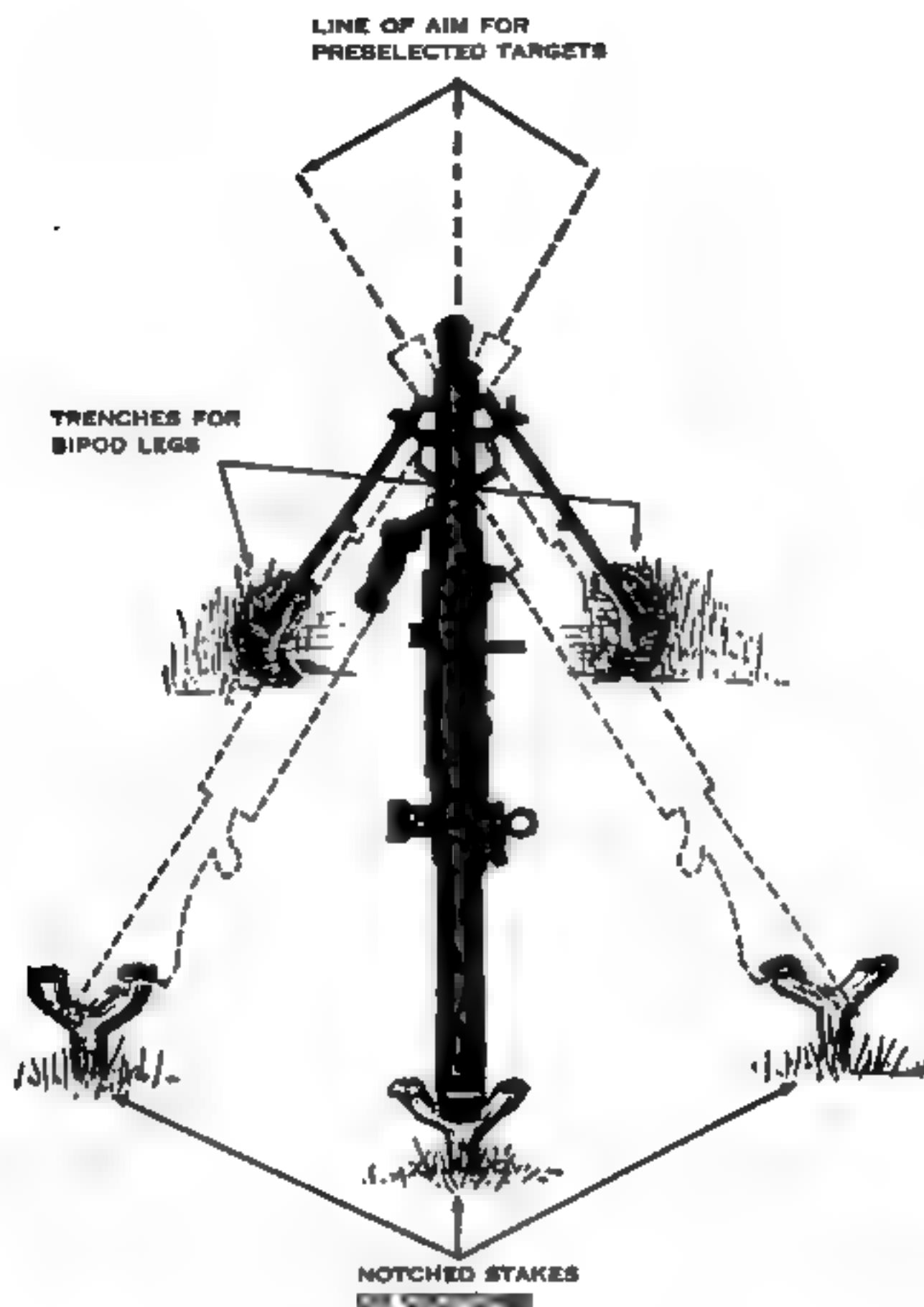


Figure 50. Notched stake or tree crotch technique of engaging preselected targets.

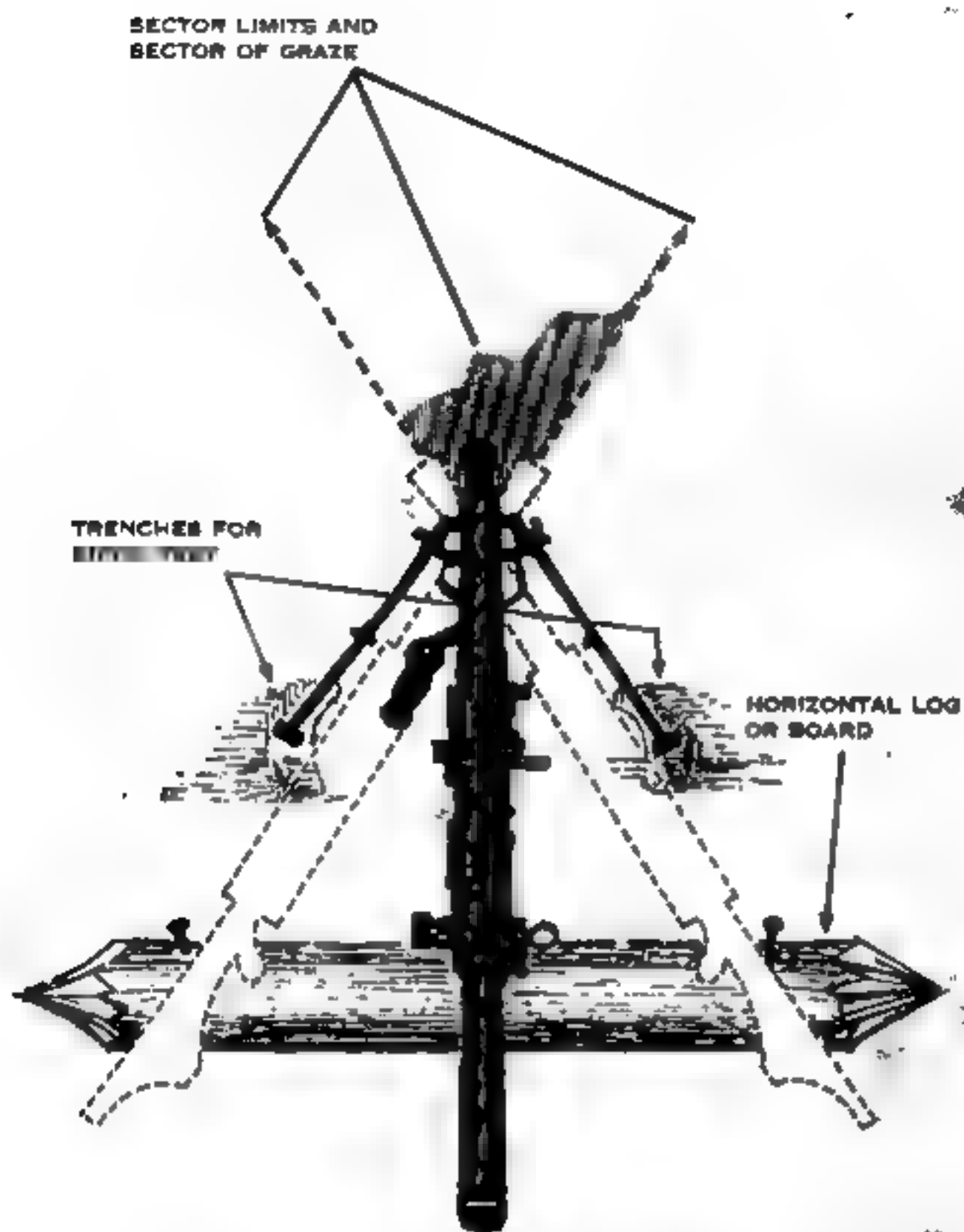


Figure 31. Horizontal log or board used with the bipod mounted M1918A2 machinegun.

barrel jacket of the weapon. The log or board should be positioned in such a way that the barrel, when resting on the log, will be at the

proper elevation to obtain sector of-grazing fire. The limits of sector are marked, when appropriate, as discussed in (a) above.

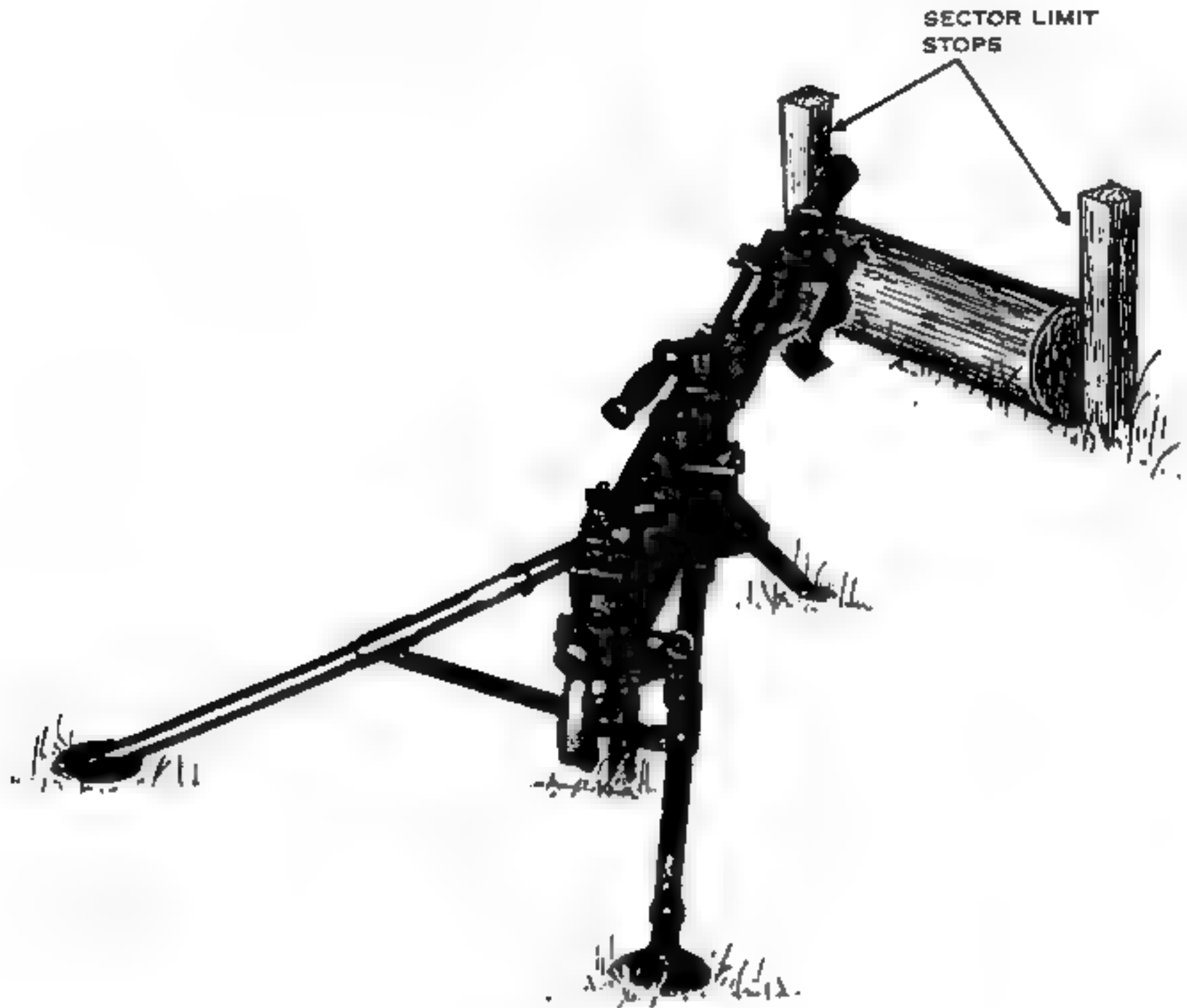


Figure 22. Horizontal log or board used with the tripod mounted M1919A6 machinegun.

CHAPTER 4

MACHINEGUN MARKSMANSHIP TRAINING

Section I. INTRODUCTION

70. General

Machinegun marksmanship training includes training on both the basic (10-meter) and transition ranges. During this training a gunner is taught the fundamentals of machinegun marksmanship with the bipod and tripod mounted machinegun. This training is conducted in three phases: bipod instructional firing on the basic (10-meter) range, tripod instructional and record firing on the basic (10-meter) range, and instructional and record firing on the transitional range.

71. Organization for Training

a. The conduct of training as outlined in this

chapter is predicated upon a unit of 200 to 250 men, as would normally be the case in advanced individual training. Where groups of other sizes are involved, the training must be modified accordingly.

b. A standard basic (10-meter) range can accommodate a unit of approximately 200-250 men at a time; therefore, concurrent training is not required. However, a standard transition range (ten lanes) cannot accommodate a unit of this size at one time, and the use of concurrent training is recommended to effectively utilize allotted training time.

Section II. BASIC MARKSMANSHIP TRAINING, BIPOD MOUNTED GUN, BASIC (10-METER) RANGE

72. General

During basic marksmanship training with the bipod mounted gun, the objectives and fundamentals of machinegun marksmanship are taught and applied during live fire exercises. This instruction is also designed to familiarize the gunner with the characteristics, noise, and recoil of the weapon during firing.

a. The objectives of machinegun marksmanship are—

- (1) Obtaining an accurate initial burst.
- (2) Traversing and searching the gun.
- (3) Observation and adjustment of fire.
- (4) Operating with speed.

b. In addition to the objectives and fundamentals, the following subjects are covered in this section:

- (1) Fire commands used on the basic range.
- (2) Basic marksmanship target.
- (3) Analysis and scoring of the target.
- (4) Range facilities.
- (5) Conduct of instruction.
- (6) Organization for firing and conduct of firing exercises.

73. Obtaining an Accurate Initial Burst

The effectiveness of machinegun fire is increased considerably when the gunner obtains an accurate initial burst. To obtain an accurate initial burst, the fundamentals of position and grip, sight alignment and sight picture, trigger manipulation, and zeroing must be properly applied.

a. *Position and Grip* (fig. 93).

- (1) The gunner assumes a prone position

directly behind the gun and raises the front and rear sight.

- (2) He places the shoulder stock on his right shoulder. An imaginary line drawn through the gun should bisect his right shoulder and his right buttock.
- (2) His legs are spread a comfortable distance apart and his heels, if possible, are down.
- (4) His right hand grasps the grip, index finger resting lightly on the trigger.
- (5) His left hand grasps the shoulder stock, palm down.
- (6) With both hands, he exerts a firm, steady pressure down and to the rear while both aiming and firing the gun.
- (7) His cheek rests lightly against his left hand with his eye as close to the rear sight as possible.
- (8) His shoulders are level and his elbows are an equal distance from the receiver of the gun.

b. Sight Alinement and Sight Picture.

- (1) *Sight alinement.* To obtain correct sight alinement, the gunner centers the front sight blade in the rear (peep) sight (1, fig. 94).

- (2) *Sight picture.* To obtain a correct picture, the gunner obtains the correct sight alinement and centers the target over the front sight blade (2, fig. 94).

c. Trigger Manipulation. When firing the caliber .30 machinegun, the trigger is not pulled slowly as it is with most small arms. It is raised quickly and then released. This aids the gunner in controlling the number of rounds in each burst. To time himself in firing a 6-round burst, the gunner raises the trigger and says, FIRE A BURST OF SIX, and then releases it.

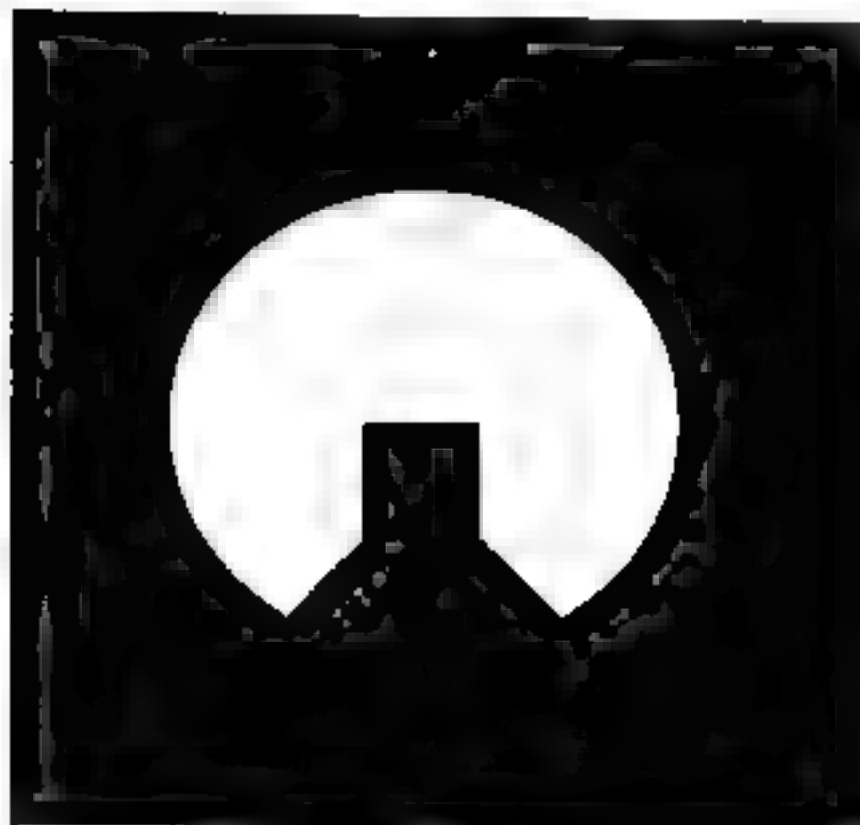
d. Zeroing. This is adjusting the sights until the strike of the projectiles coincide with the point of aim at a given range. Zeroing the machinegun on the basic range is accomplished through the following step-by-step procedure.

- (1) *Step 1—set sights.* To establish a common starting point when zeroing on the basic range, a range setting of 600 yards should always be used. The gunner sets this range and aligns the windage index by placing zero windage on the rear sight. He then



Figure 93. Position and grip, bipod mounted gun.

lowers the front sight blade to its lowest position and backs off four notches.



①



②

Figure 94. Correct sight alignment and sight picture.

(2) *Step 2—fire three rounds.* Upon receiving the command to fire, the gunner fires three rounds (one round at a time) to establish a shot group. The shot group should be small enough to determine exactly where the center of the group is in relation to the aiming paster. No adjustments are made on the sights until all three rounds have been fired.

(3) *Step 3—check the lay of the gun.* The gunner looks through the sights and insures that he maintains the same sight alignment and sight picture that he had when he fired his original three rounds.

(4) *Step 4—correct for deflection.* If the center of the shot group is to the left or right of the point of aim, the gun must correct for deflection. To correct for deflection (without moving the lay of the gun), the gunner directs the assistant gunner to turn the windage knob, thus causing the rear sight to move to the center of the shot group.

(5) *Step 5—correct for elevation.* If the center of the shot group is above or below the black aiming paster, the gunner must correct for elevation. To correct for elevation (without moving the lay of the gun), the gunner directs the assistant gunner to turn the front sight blade adjusting nut, thus causing the front sight blade to be moved to the center of the shot group.

(6) *Step 6—confirm.* After corrections for deflection and elevation are made, the gunner fires a confirming round. If he misses his point of aim, he treats this hit as the center of a three-round shot group and repeats the procedures for deflection and elevation. He then fires another confirming round. He continues this procedure until he hits the point of aim.

- (7) *Step 7—record deflection zero.* The gunner notes and records the deflection for future reference.

74. Traversing and Searching the Gun

Machinegun targets may have width and depth, which requires the gunner to move the gun to distribute fire throughout the target

a. *Traversing.* This is moving the muzzle of the weapon to the left or right to distribute fire laterally. With the bipod mounted gun, this is accomplished by selecting successive aiming points in the target area. The gunner makes minor changes in direction by shifting his shoulders slightly to the right or left. To make major changes in direction, the gunner

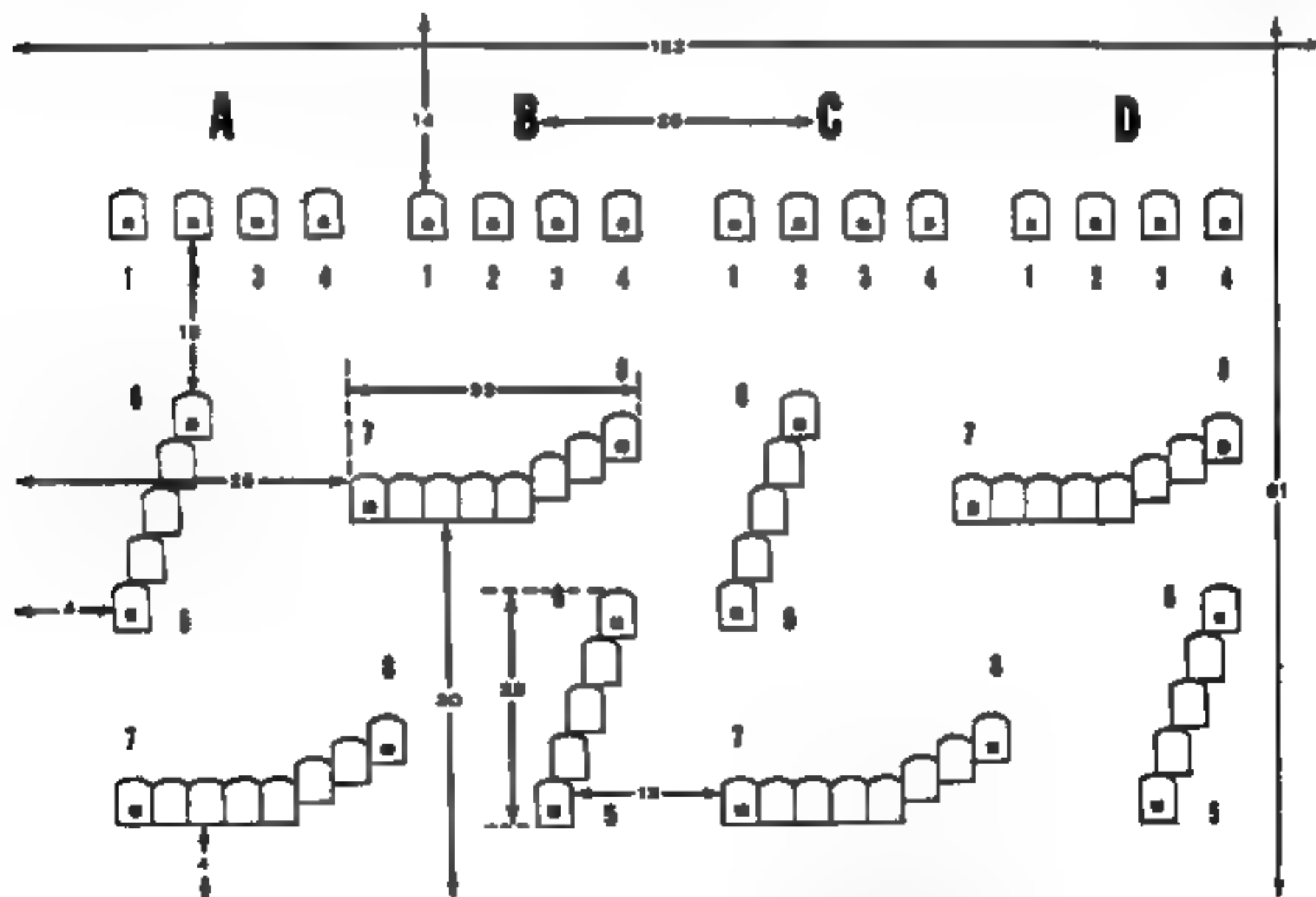
moves his elbows and realines his body to remain directly behind the gun.

b. *Searching.* This is moving the muzzle of the weapon up or down to distribute fire in depth. It is accomplished by selecting successive aiming points in the target area. To make changes in elevation, the gunner moves his elbows closer together or farther apart.

75. Observation and Adjustment of Fire

Gunners must be taught to observe and rapidly adjust their fire.

a. *Observation of Fire.* Machinegun fire is observed by noting the strike of the projectiles in the target area, by observing tracers in their flight, or, in the case of the 10-meter range, by noting the holes made in the target.



ALL MEASUREMENTS IN CENTIMETERS

Figure 25. Basic machinegun marksmanship target.

b. *Adjustment of Fire.* When firing the bipod mounted gun, fire is adjusted by changing the gunner's body position as outlined in paragraph 74.

76. Operating with Speed

Gunners must be capable of delivering effective fire onto a given target with speed. Initially, however, emphasis must be placed upon attaining proficiency in the first three objectives. Speed will come as a byproduct while becoming skilled in the first three objectives.

77. Fire Commands

The standardized fire command is used as a means of control during marksmanship training. The fire command as it applies to the basic range must be explained to the gunner. The elements are given (as appropriate) before each firing exercise. The gunner takes the appropriate action, as indicated, and repeats each element as it is announced.

a. *Alert.* The alert is given as FIRE MISSION. Upon receipt of the alert, the gunner fully loads his weapon.

b. *Direction.* Since all targets appear to the gunner's front, the direction is given as FRONT.

c. *Description.* Since the gunner aims at black aiming pasters, description is announced as PASTER NUMBER _____ (paster 1-8 as appropriate), at which time the gunner lays on the announced paster.

d. *Range.* A range setting of 600 yards on the rear sight is always used on the basic range. This is announced as SIX HUNDRED, at which time the gunner must insure that his rear sight reflects the correct range setting.

e. *Method of Fire.* Manipulation is announced as FIXED, TRAVERSE, SEARCH, and TRAVERSE AND SEARCH. All firing on the basic range with the bipod mounted gun is at point targets, so the method of fire is announced as FIXED. The gunner fires either single rounds or bursts of six at a rate slower than the sustained rate; therefore, the rate of fire element is omitted.

f. *Command to Open Fire.* To facilitate control, this is announced as AT MY COMMAND. When the gunner is ready, he announces UP to the assistant gunner who extends his right arm and hand in the READY signal. When all gunners are ready to fire the command FIRE is given.

78. Basic Machinegun Marksmanship Target

The basic machinegun marksmanship target (fig. 96) is used for all firing on the basic range. An explanation of the target, to include the size of the aiming pasters and scoring spaces, will aid the gunners in zeroing their weapons and facilitate control during the firing exercises.

a. The target consists of four sections lettered A, B, C, and D respectively, each of which consists of scoring spaces for eight fixed fire exercises (scoring spaces 1, 2, 3, 4, 5, 6, 7, and 8) and two traversing and searching exercises (scoring spaces 6 through 5 and 7 through 8).

b. Each scoring space is four centimeters wide and five centimeters high.

c. The black aiming paster within each numbered scoring space is one centimeter wide by one centimeter high.

79. Analyzing and Scoring the Target

Targets are analyzed and scored to determine the fundamentals in which gunners need more training and to determine their degree of proficiency.

a. *Analyzing.* During bipod firing, a target is best analyzed by considering the fundamentals of positioning and grip, sight alignment, and sight picture.

- (1) Large shot groups are usually due to incorrect position and grip; however, it may be due to headspace adjustment.
- (2) Tight (small) shot groups, which are outside of the scoring space, are usually due to incorrect sight alignment or sight picture.

b. *Scoring.* Bipod firing (tables I, app II) is scored for instructional purposes only and may be scored by the gunner. Pasterns 1 and 2 are used for zeroing and are not scored.

- (1) One point is given for each hit (not to exceed six) in each scoring space. Holes touching the boundary of a scoring space are considered hits.
- (2) A bonus of two points is given for each scoring space hit, regardless of the number of rounds within the space.
- (3) Since six scoring spaces are engaged with 36 rounds, the total possible score for table I, appendix II, is 48 points. A score of 26 is satisfactory.

80. Range Facility

A standard basic range should consist of the following (fig. 86):

a. *Firing Line.* The firing line is of sufficient length to properly emplace 100 guns or more, allowing approximately three meters between guns. To facilitate control, each gun position should be numbered.

b. *Targets.* The target line is 10 meters in front of the firing line. The machinegun marksmanship target (fig. 86) is a paper target

pasted onto target cloth which is stretched over a wooden frame. One target is set up for each gun position and is numbered to correspond with the numbered gun position. The dimensions of the target are shown in figure 146, FM 23-67.

c. *Instructional Site.* A bleacher with the required seating capacity located to the immediate rear of the firing line is desirable.

d. *Control Tower.* To control the firing line, a control tower is centrally located to the immediate rear of the firing line.

81. Conduct of Instruction

Initially the entire unit is assembled and presented instruction on the objectives and fundamentals (para 72-76), fire commands used on the basic range (para 77), basic machinegun marksmanship target (para 78), analyzing and scoring the target (para 79), and the following:

a. *Course of Fire.* Bipod firing on the basic range consists of firing 42 rounds as outlined in table I, appendix II.

- (1) The gunner is first allotted six rounds with which to zero. He zeros, as outlined in paragraph 78d, by firing three

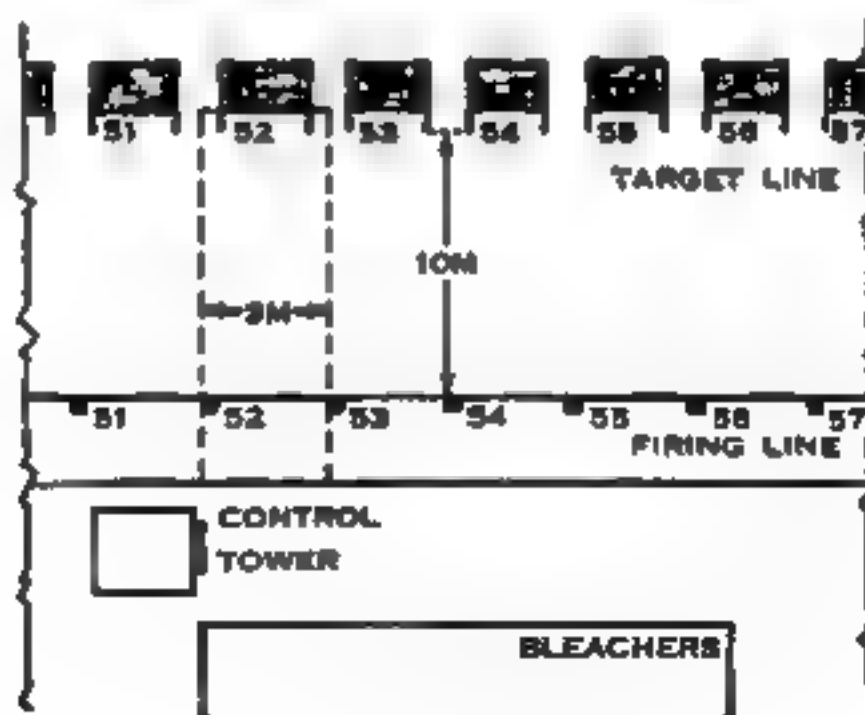


Figure 86. Basic range.

rounds singly at paster 1 and his confirming rounds at paster 2.

- (2) The gunner then fires six spacings of six rounds each at pasters 3, 4, 5, 6, 7, and 8. He attempts to fire a 6-round burst into each of the scoring spaces. A fire command is given for zeroing and for the firing of each of the spacings of six rounds.

b. Prefiring Checks. Before any weapon is fired, all of the prefiring checks are performed as outlined in paragraphs 55 through 58.

c. Procedures for Clearing the Gun. The correct procedure for clearing the caliber .80 machinegun, which must be explained and demonstrated to the gunners, is as follows:

- (1) Raise the cover, remove the belt, pull the bolt to the rear and engage the extractor cam plunger in the notch in the rear of the extractor feed cam. Check to see that there is no ammunition in the chamber or the T-slot. Do not lower the cover.
- (2) Additional precautions are taken during training when clearing the gun. After the steps above have been accomplished, a wooden block, which extends above and below the receiver approximately 1 inch, is inserted in the receiver between the bolt and the rear of the barrel. A cleaning rod is then inserted in the muzzle end of the barrel and pushed through the bore until it can be seen in the receiver and then immediately removed. These precautions apply to field exercises and maneuvers as well as other types of training.

d. Safety Precautions. Additional safety precautions are covered in Appendix V, FM 23-87 and appendix VII of this manual.

e. Assistant Gunner's Duties. Throughout bipod firing, the assistant gunner lies to the left of the gunner. His duties include—

- (1) Assisting the gunner during prefiring checks.
- (2) Checking the gunner's position and grip.

- (3) Assisting the gunner in loading.
- (4) Extending his right arm and hand in the READY signal when he receives an UP from the gunner.
- (5) Assisting the gunner in zeroing.
- (6) Pointing out errors to the gunner, such as failing to repeat the elements of the fire commands, firing an incorrect exercise, and failing to properly clear the weapon.

82. Organization for Firing and Conduct of Firing Exercises

a. Organization. To conduct firing, the unit is organized into five equal groups. Each group is divided into two firing orders. One order becomes gunners, and the other order becomes assistant gunners.

b. Conduct of Firing.

- (1) The gunners and assistant gunners at each gun position set up their guns and perform prefiring checks.
- (2) The gunner is required to assume the correct gunner's position and to aim at paster 1. The assistant gunner checks his position and has him explain what sight alignment and sight picture he has taken.
- (3) The gunner is then given fire commands which require him to place range settings on the rear sight. This is done to insure proficiency in moving the rear sight and obtaining accurate sight settings. The assistant gunner checks the manner in which the gunner sets his sight, checks the range settings for correctness, and points out any errors.
- (4) A fire command is then issued requiring the first order to zero their guns.
- (5) At the completion of zeroing, individual fire commands are issued which require the gunners to engage each of the six remaining numbered scoring spaces. Sufficient time is allowed between bursts to permit the gunners to observe their firing from the firing line.

- (6) After the first order has fired table I, appendix II, the second order fires the course in the same manner.
- (7) After both orders have fired, the weapons are cleared.
- (8) After the weapons have been cleared,

both orders move to the target line where they analyze and score their targets as outlined in paragraph 79.

- (9) Following this, the targets are analyzed, and the firing is critiqued by qualified personnel.

Section III. BASIC MARKSMANSHIP TRAINING, TRIPOD MOUNTED GUN, BASIC (10-METER) RANGE

83. General

Basic marksmanship training with the tripod mounted gun is a continuation of basic marksmanship training with the bipod mounted gun. The same four objectives which applied to the bipod mounted gun also apply here; however, the techniques used in attaining these objectives differ in some instances. Therefore, the gunner is taught these techniques as they apply to the tripod mounted machinegun. He then applies these techniques during manipulation and dry fire exercises and practice and record firing on the basic (10-meter) range.

84. Mounting and Emplacing the Gun

To assist in delivering accurate fire, the gun must be properly mounted and emplaced.

a. Mounting the Gun.

- (1) Place the mount on the ground with the front leg pointing toward the center of the target.
- (2) Place the gun on the mount (para 64c).
- (3) Center the traversing mechanism and expose one and a half inch of thread on the elevating screw above and below the elevating handwheel.
- (4) Attach the traversing and elevating mechanism to the gun and clamp the left edge of the traversing bar slide on the zero graduation on the traversing bar.

b. Emplacing the Gun.

- (1) The gunner aligns the gun and the mount for direction by shifting the rear legs of the tripod until the gun

is pointing to the approximate center of the target.

- (2) The gunner then loosens the dirt around and under the tripod feet and firmly emplaces the tripod shoes in the ground.
- (3) If the traversing bar is not level, he removes the dirt from under one or both of the rear shoes to level it. He also insures that only the tripod feet, and not the legs, are in contact with the ground, and that dirt is removed from under the traversing bar to insure that the slide can be moved freely across the bar.

85. Obtaining an Accurate Initial Burst

To obtain an accurate initial burst with the tripod mounted gun, the fundamentals of position and grip, sight alignment and sight picture, trigger manipulation, and zeroing must be properly applied.

a. Position and Grip (fig. 97).

- (1) The gunner assumes the prone position directly behind the gun so that a straight line drawn through the weapon would bisect his right shoulder and his right buttock.
- (2) His legs are spread a comfortable distance apart and, if possible, his heels are down.
- (3) He grasps the grip with his right hand, index finger resting lightly on the trigger.
- (4) With his left hand, palm down, he grasps the elevating handwheel and exerts a firm pressure downward and

to the front with both hands, both while aiming and firing the gun.

- (5) His sighting eye should be as close to the rear sight as possible.
- (6) His elbows are inside the tripod legs, but not touching the tripod.

b. *Sight Alignment, Sight Picture, Trigger Manipulation, Zeroing.* These techniques for the tripod mounted gun are the same as outlined in paragraphs 72 through 82 for the bipod mounted gun.

86. Traversing and Searching the Gun

Machinegun targets may have width and depth which requires the gunner to move the gun by manipulating the handwheels in order to distribute fire throughout the target area.

a. *Changes.* All manipulations are made with the left hand. Changes in direction are made first and then changes in elevation. The three manipulations are traverse, search, and traverse and search.

b. *Traversing.* To make changes in direction, the following fundamentals are applied:

- (1) To move the muzzle of the gun to the right, the gunner puts his left hand on the traversing handwheel, thumb up, and pushes his thumb away from himself (PUSH RIGHT).
- (2) To move the muzzle of the gun to the left, the gunner pulls his thumb toward himself (PULL LEFT).

a. *Searching.* To make changes in elevation, the following fundamentals are applied:

- (1) To move the muzzle of the gun (search up), the gunner grasps the elevating handwheel with his left hand and pushes his thumb away from himself (PUSH ADD).
- (2) To move the muzzle of the gun down (search down), he pulls his thumb toward himself (PULL DROP).

87. Observation and Adjustment of Fire

Gunners must be taught to observe and rapidly adjust their fire.

a. Observation of fire is the same as outlined in paragraph 75a.



Figure 87. Position and grip, tripod mounted gun.

b. To adjust fire when firing the tripod mounted gun, the gunner makes adjustments by manipulating the traversing and elevating handwheels. A 1-click adjustment on either wheel equals a 1-mil change, and will move the strike of the projectile 1 centimeter (the width or height of the black aiming pasteur) on the 10-meter range.

88. Operating with Speed

Gunner must be capable of delivering effective fire onto a given target with speed. During the initial training of a gunner, however, emphasis must be placed on the first three objectives before he is required to operate with speed. Speed will come as a byproduct while attaining skill in the first three objectives. The only timed exercises are record practice firing and record firing.

89. Analyzing and Scoring the Target and Maintaining the Scorecard

Targets are analyzed to determine the objectives and fundamentals in which the gunner needs more training. The targets are scored to determine the degree of proficiency of the gunner, and a scorecard is maintained as a record of his performance.

a. Analyzing the Target.

- (1) *Large shot groups.* This is usually due to—
 - (a) Incorrect position and grip.
 - (b) Improper emplacement of the gun.
 - (c) Incorrect headspace adjustment.
- (2) *A tight (small) initial shot group outside the first scoring space.* This is usually due to incorrect sight alignment or sight picture.
- (3) *Second or subsequent bursts outside the scoring spaces.* This is caused by a failure to properly traverse or search the gun.
- (4) *Tight shot groups fired continuously either high, low, right, or left of each scoring space.* This indicates a failure to properly observe and adjust fire.
- (5) *Failure to complete a firing exercise*

in the time prescribed. This indicates a need for more training in the first three objectives.

b. *Scoring the Target* (fig. 95). During all firing except record firing, the gunner may score his target. Only exercises 7-8 and 6-5 are scored.

- (1) One point is given for each hit, not to exceed six in each scoring space. Holes touching the boundary of a scoring space are considered hits but can be counted in only one scoring space.
- (2) A bonus of two points is given for each scoring space engaged, regardless of the number of hits within the space.
- (3) When firing exercise 7-8, eight scoring spaces are engaged with 48 rounds. The possible score is 64 points. When firing exercise 6-5, five scoring spaces are engaged with 30 rounds. The possible score is 40 points.
- (4) The total possible score for exercise 7-8 and 6-5 is 104 points. A minimum score of 65 points is required for the gunner to qualify on the basic range.

c. Maintaining the Scorecard (fig. 98).

- (1) A scorecard is issued to each gunner. All scores are entered by authorized personnel and are made in ink or indelible pencil. No erasures are allowed.
- (2) Alterations may be made only by the unit commander or an officer acting as scorer, and they must be authenticated.
- (3) All scorecards are checked and signed by an officer.

90. Record Firing Procedures

This firing should take place on a day subsequent to practice firing. It will be necessary for gunners to emplace and zero their guns. Before record firing is conducted, all person-

MACHINE GUN MARKSMANSHIP (FM 35-57)		SCORE CARD COVER 100 100-2 100-3		
LAST NAME - FIRST NAME - MIDDLE INITIAL TRAMMELL, JOHNNY C.				
SERVICE NUMBER 05 315 294				
ORDER		VARIETY		
BASIC RANGE				
PRACTICE	GROUP	SCORE		TOTAL SCORE
		1-5-4	5-5	5-4
1ST	26		23	39
20				
30				
4TH				
5TH				
6TH				
RECORD	26		28	44
SIGNATURE (Placed)				
SCORER <i>Sgt. J. J. K... ..</i>		FIRE <i>Johnny C. Trammell</i>		
ORDER		VARIETY		
BASIC RANGE				
TARGET	PRACTICE		RECORD	
	1-5	5-5	5-4	
1	●		●	
2	○		●	
3	○		●	
4	●		●	
5	●		●	
6	○		●	
7	○		○	
8	●		●	
NO. TARGETS ENGAGED	8		8	
SCORE TARGETS HIT 315	40		70	
SIGNATURE (Placed)				
SCORER <i>Sgt. Paul Hudson</i>		FIRE <i>Johnny C. Trammell</i>		
QUALIFICATION EXPERT		AGGREGATE SCORE 168		
DATE 14 FEB 64		CHECKED BY <i>Paul H. Hudson Jr.</i>		

[illegible]

Figure A2. Scorecard

nel (gunners and instructors) must be familiar with the time and ammunition allowances, procedures followed in the event of a stoppage, and penalties imposed.

a. Time and Ammunition Allowances (table IV, app II).

- (1) The gunner is allotted six rounds to zero.
- (2) He is then given individual fire commands and fires four spacings of six rounds at pasters 1, 2, 3, and 4 for practice in firing 6-round bursts.
- (3) He is then allotted 60 seconds to fire 48 rounds at exercise 7-8 on command, and 40 seconds and 80 rounds to fire 6-5 on command.

b. Stoppages.

- (1) If a stoppage occurs, the gunner must apply immediate action. If the stoppage is reduced, he continues to fire the course. To complete firing of the exercise the gunner is allotted an additional 15 seconds for each application of immediate action.
- (2) If a stoppage occurs which cannot be reduced by applying immediate action, the gunner raises his hand and announces TIME.
- (3) Upon hearing a gunner announce TIME, the assistant instructor notes the time, insures that a legitimate stoppage exists, and assists the gunner in reducing it. He then instructs the gunner to complete firing, allowing him an additional 15 seconds for each application of immediate action.
- (4) If the cause of a stoppage is due to an error on the part of the gunner, additional time is not permitted. The gunner then receives the score he obtained before the stoppage occurred.
- (5) If it should be necessary to replace the entire weapon, the gunner is given six rounds to zero the new weapon and he may then refire the exercise.
- (6) Gunners who could not complete firing in the time allotted due to mal-

functions and applying immediate action finish the exercise in an alibi run after all other gunners complete firing.

c. Penalties.

- (1) A penalty of five points is deducted from the score of any gunner who fails to stop firing at the command or signal to cease fire.
- (2) One additional point is deducted for each round in excess of three fired after the command CEASE FIRE is given.
- (3) If a gunner fires at the wrong target or exercise, he loses the points for those rounds. The gunner whose target is fired upon by another gunner is permitted to refire the exercise.

91. Preparatory Training

a. Instruction.

- (1) Prior to conducting live fire exercises, the entire unit is assembled in the bleachers, and instruction is presented on mounting and emplacing the gun (para 84), position and grip (para 85a), and traversing and searching (para 86).
- (2) Manipulation and dry fire (spotter) exercises are also demonstrated. They are designed to give the gunner practice in traversing and searching the gun and in observation and adjustment of fire.
- (3) Sight alignment, sight picture, trigger manipulation, zeroing, fire commands, and the basic marksmanship target are reviewed as outlined in paragraphs 72 through 82.

b. Manipulation Exercises and Dry Fire (Spotter) Exercises (fig. 147, FM 23-87). The unit is organized into five groups, and each group is divided into two orders. One order is designated as gunners, and the other order is designated as assistant gunners.

(1) Manipulation exercises.

- (a) Upon command the gunner assumes

his position behind the gun. The assistant gunner moves to a position approximately ten steps to the gunner's front and slowly moves his hand right, left, up, and down requiring the gunner to follow these movements with the gun by manipulating the traversing and elevating handwheels.

- (b) After the gunner reaches the degree of proficiency required, the assistant gunner becomes the gunner and the exercises are repeated in the same manner.

(2) *Dry fire (spotter) exercises.*

- (a) The gunner assumes his position behind the gun. The assistant gunner assumes the assistant gunner's position, which is to the gunner's left.
- (b) The gunner is given a fire command at which time he lays on the announced paster and gives an UP to the assistant gunner when he is ready to fire.
- (c) The assistant gunner performs the following actions:
 1. Checks the gunner's sight setting and, after satisfying himself that the setting is correct, announces **SIGHT SETTING CORRECT**.
 2. Checks to see that the gunner is laid on the correct exercise, makes corrections if necessary, and then announces **EXERCISE CORRECT**.
 3. Checks the gunner's position and grip, makes corrections if necessary, and then announces **POSITION AND GRIP CORRECT**.
 4. The assistant gunner then changes the lay of the gun for direction by moving the traversing handwheel not less than five nor more than ten clicks (mils). If the gunner is dry firing exercise 7-8, he lays the gun off to the left; and when dry firing exercise 6-5, he lays it off to the right. This is to require the

gunner to traverse in the direction of paster 6 or paster 7, as appropriate, and to take out some slack from the traversing mechanism.

- 5. The assistant gunner then picks up a spotter, goes to the target line, and assumes his position behind the target.
- 6. Upon the command **FIRE**, the exercise is conducted as follows (based on firing exercise 7-8):
 - (a) The gunner relays and aims at paster 7 and announces **AIM**.
 - (b) While he simulates firing a 6-round burst, he announces **FIRE A BURST OF SIX**. The assistant gunner then places the spotter in the center of paster 7.
 - (c) The gunner then raises his head to observe his fire and announces **LOOK**.
 - (d) When the gunner observes the spotter in the center of paster 7, he must traverse to the right four clicks (four mils) to engage the next scoring space. While he does this, he announces **RIGHT FOUR**.
 - (e) He then simulates firing another 6-round burst and announces **FIRE A BURST OF SIX**.
 - (f) The assistant gunner places the spotter in the center of the next scoring space, and the exercise is continued in this manner until they reach the elbow of exercise 7-8. Then the gunner traverses to the right in 4-mil increments, searches up in 2-mil increments and announces **LOOK, RIGHT FOUR, ADD TWO** throughout the remainder of the exercise.

(8) *Additional training.*

- (a) To provide additional training, the

spotter is sometimes placed outside a given scoring space. This requires the gunner to observe and make varying adjustments based upon his observation. When the gunner sees that he has missed a scoring space with a 6-round burst, he re-lays back on the scoring space he missed and splits his next 6-round burst. He fires a 3-round burst at the space he missed and a 3-round burst at the next scoring space. This is done to insure complete target coverage. The gunner announces his adjustments aloud. For example: RIGHT SIX, ADD FIVE, FIRE A BURST OF THREE.

- (b) After conducting one exercise (7-8 and 8-5), the gunner and assistant gunner change over and go through the exercise again in the same manner.

92. Conduct of Firing

Live fire exercises provide the gunner an opportunity to apply the fundamentals of marksmanship. During the practice firing, the assistant gunner performs the same duties he performed during the dry fire exercise (para 81b(2)), except that he does not move forward of the firing line. During record practice firing and record firing, the assistant gunner performs no checks, but he assists in controlling the firing (para 81c(4)).

a. *Instruction.* The entire unit is assembled in the bleachers and instruction is presented on the courses of fire (tables II, III, and IV, app. II), scoring and analyzing the target (para 89), record firing procedures (para 90), and the safety regulations (app V, FM 23-67 and app VI, this manual).

b. *Courses of Fire.* The unit is organized into five groups and each group is divided into two orders. One order is designated as gunners, and the other order is designated as assistant gunners.

- (1) *Practice firing* (table II, app II).

Each gunner is issued six single rounds, four spacings of six rounds, one belt of 48 rounds, and one belt of 80 rounds.

- (a) The gunner and assistant gunner at each gun position set up their guns and perform the prefiring checks (para 55-58).
- (b) The gunner zeroes as outlined in paragraph 73d.
- (c) Fire commands are given requiring the gunner to fire four spacings of six rounds each at pasters 1, 2, 3, and 4, to give him additional practice in firing 6-round bursts.
- (d) The gunner is then given a command to fire the 48-round belt at exercise 7-8, attempting to place a 6-round burst in each of the eight scoring spaces.
- (e) The gunner is then given a command to fire the 80-round belt at exercise 8-5, attempting to place a 6-round burst in each of the five scoring spaces.
- (f) The gun is cleared (para 81c) and the gunner moves to the target line to score and analyze his target. While the gunners are scoring and analyzing their targets, assistant instructors critique each gunner individually.
- (g) After the scoring, analysis and critique of the first order, the gunner and assistant gunner change over and the second order fires the exercises in the same manner.
- (2) *Record practice firing* (table III, app II). This is a timed exercise designed to emphasize the necessity for operating with speed and to familiarize the gunner with record firing procedures.
 - (a) This firing immediately follows practice firing.
 - (b) Exercises 7-8 and 8-5 are fired. The gunner is allotted 50 seconds to fire exercise 7-8 and 40 seconds to fire exercise 8-5.

- (c) During this firing the assistant gunner performs no checks.
 - (d) Before each exercise is fired, instructor personnel lay the guns off for direction (to the left of pastar 7 when firing 7-8, and to the right of pastar 8 when firing 6-5).
 - (e) The assistant gunner must be directed to observe the control tower or other control elements, such as flagmen, to cause the gunner to cease fire on command. He taps the gunner on the back when he receives the cease fire signal.
 - (f) Upon completion of firing both exercises, the targets are analyzed and scored.
- (8) *Record firing* (table IV, app II). This firing is conducted on a day subsequent to practice firing (para 92b(1)).
- (a) The unit is organized into five groups, and each group is divided into two orders.
 - (b) The gunners and assistant gunners emplace their guns and perform the prefiring checks.
 - (c) The first order zeroes the guns.
 - (d) After zeroing is completed, the left half of each group fires for record, and the right half of each group dry fires the course.
 - (e) Then the right half of each group fires for record, and the left half of each group dry fires the course.
 - (f) After the first order has fired, the gunners and assistant gunners change over and the second order fires for record.
 - (g) Upon completion of all firing, weapons are cleared, instructor personnel score the targets, record the scores (para 89c), and conduct a final critique.

Section IV. TRANSITION FIRING

93. General

a. Bipod firing on the basic (10-meter) marksmanship range teaches the gunner the basic fundamentals of firing the bipod mounted gun. Later, when the gunner moves to the transition range, he is taught to engage targets at long ranges with the bipod mounted gun.

b. Transition firing provides the gunner the necessary experience to progress from basic (10-meter) range firing to field firing. At the completion of transition firing, field firing as discussed in chapter 11, FM 23-87, should be conducted (excluding assault firing). Transition firing is also the final phase of a gunner's qualification. A standard transition range (10 lanes) can accommodate approximately 75 personnel; therefore, concurrent training must be conducted when larger groups are involved.

c. During transition firing the individual receives training in the fundamentals of long-range target engagement to include character-

istics of fire, field zeroing, range determination, and the adjusted aiming point method of fire adjustment.

94. Range Facility

A standard transition range facility should consist of the firing range and concurrent training areas.

a. *Transition Range.* A standard firing range consists of 10 lanes (fig. 99). The gunner fires twice on the transition range—once for practice and once for record. This firing is conducted on two different lanes; therefore, a minimum of two lanes is required regardless of the size of the unit.

- (1) *Firing lanes.* Each firing lane of a transition range should be five to ten meters wide at the firing line and 75 meters wide at the greatest range of 800 meters.

- (2) *Targets and their locations.* Either

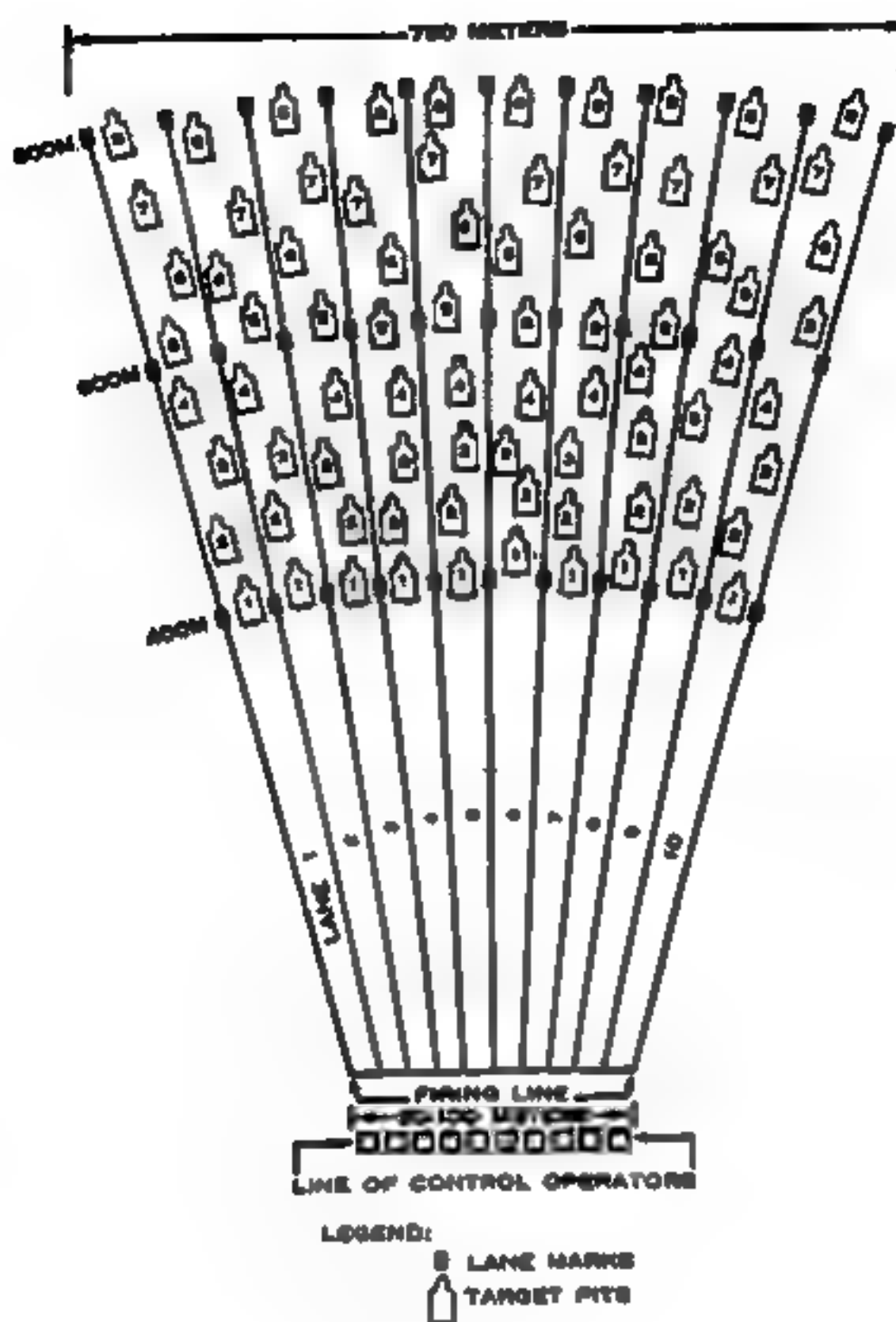


Figure 99. Transition maps.

eight single E-silhouette targets or eight double E-silhouette targets must be used in each lane (double E-silhouettes if possible). The target closest to the firing line is target number 1 and is located at a range of 400 meters. The target farthest from the firing line is target number 8 and is located at a range of 800 meters. The remaining six targets are located at

various ranges between targets number 1 and 8. Any two of these targets, as they appear to a gunner from the firing line, must be at least five miles apart in width or 150 meters apart in depth. This spacing of the targets will require the gunner to make a major change in either direction or elevation when engaging any two successive targets.

- (3) *Target devices.* Electrical target devices (M30 or M31A1) are desirable; however, targets which are raised and lowered manually by pit personnel may be used. The disadvantage of the latter system is that at least 80 personnel are required to operate the pits on a standard (10-lane) range; also, communications must be established between each pit within a given lane and the target control operator for that lane.
- (4) *Target control points.* Regardless of whether the targets are operated electrically or manually, each lane must have a control point approximately 10 meters behind the firing line to control raising and lowering the targets and to facilitate scoring. It is desirable that this control point be in the form of a small wooden booth (approximately 4 feet by 4 feet by 6 feet), particularly if the range is electrically operated. The booth will also serve to house the electrical controls or the communications equipment during firing.
- (5) *Instructional site.* A bleacher with the required seating capacity located to the immediate rear of the firing line is desirable.
- (6) *Control tower.* To control the firing line, an elevated platform or control tower centrally located to the immediate rear of the firing line is desirable.

b. *Concurrent Training Areas.* Three concurrent training areas located 200 to 500 meters from the firing line are necessary. Each of these areas must be of sufficient size to seat approximately 75 individuals.

95. Field Zeroing

Gunners must be taught how to zero the weapon at long ranges.

a. During field zeroing on the transition range, a target between 400 and 700 meters should be selected. The reasons for this are

that no target on the transition range will appear at a lesser range than 400 meters, and at ranges greater than 700 meters the gunner will experience great difficulty in determining (with sufficient accuracy) where the center of the beaten zone is falling in relation to the target.

b. After determining the range to the target on which he is going to zero, the gunner places this range on the rear sight and aligns the windage index (windage zero). He also lowers the front sight blade to its lowest position and backs off four notches.

c. The gunner fires a 6- to 9-round burst at the target and notes where the burst hits the ground. If the center of impact is off the target, the gunner adjusts the sights so that the new line of aim is at the point on the ground where the center of impact struck. The gunner follows the same procedures as he did for 10-meter zeroing in order to move the sights (para 78c (4) and (5)).

d. After correcting for deflection and elevation, the gunner fires a confirming burst. If his adjustments were correct, he notes and records deflection zero.

e. If the gunner does not hit the target with the confirming burst, he repeats the same procedures treating each subsequent burst as if it were the initial burst.

96. Adjusted Aiming Point Method of Fire Adjustment

a. All machinegunners strive for an accurate initial burst. However, an accurate initial burst may not always be obtained. Therefore, gunners must have a means of rapidly and accurately adjusting their fire onto the target without going through the time consuming process of making sight adjustments. This is known as the *adjusted aiming point method of fire adjustment*.

b. If the gunner misses the target with his initial burst, he must select a new aiming point on the ground the same distance from the target as the center of impact of the initial burst, but in the opposite direction, and fire a second burst (fig. 100).

97. Qualification Scores (Basic and Transition Firing)

a. The score which a gunner receives on the basic (10-meter) range is computed as discussed in paragraph 89b. It is recorded on the same scorecard (DA Form 85) which is used to record the score on the transition range (fig. 98). In order to qualify, a minimum score of 85 points must be achieved on the basic (10-meter) range.

b. Transition firing is the second phase of a gunners' qualification. To qualify on the transition range, the gunners must engage all eight targets within the prescribed time limit. Also, if double E-silhouettes are used, he must hit a minimum of five. No minimum score is required if single E-silhouettes are used. Scoring on the transition range is accomplished as discussed in paragraph 99a.

c. If a gunner qualifies on the basic and transition ranges, his overall machinegun qualification is computed as follows:

- (1) Add the basic (10-meter) score to the transition score to obtain the aggregate score.
- (2) Determine the qualification (expert, first class gunner, second class gunner) based on the following:

Qualification	Points
Expert	155-184
First class	140-154
Second class	115-139
Unqualified	Below 115

98. Organization for Training and Conduct of Instruction

a. The entire unit is assembled in one bleacher and presented instruction on the following fundamentals:

- (1) *Target detection.* A review of target detection techniques should be conducted (FM 23-71).
- (2) *Position and grip.* Position and grip with the bipod mounted machinegun,

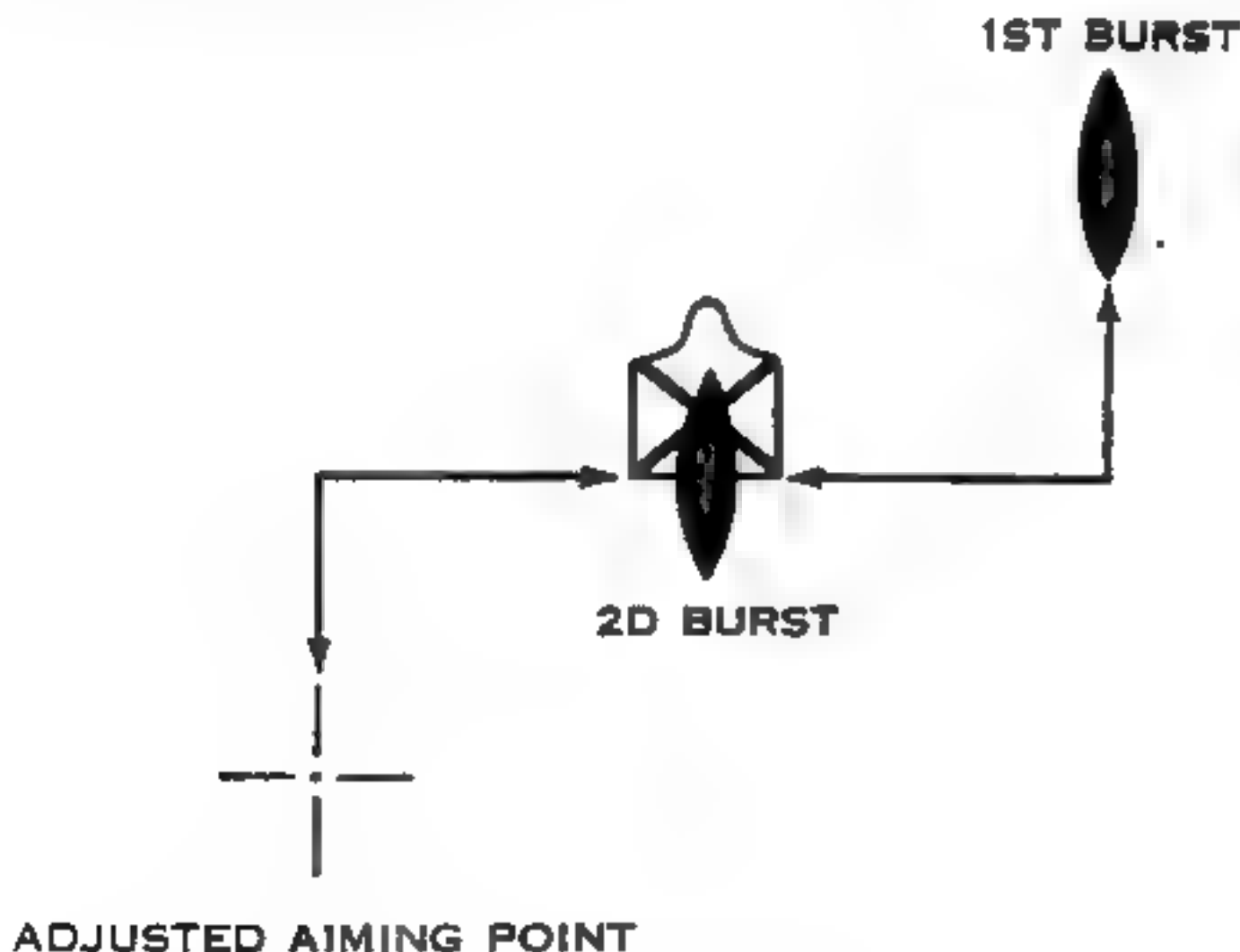


Figure 100. Adjusted aiming point.

as outlined in paragraph 73a, must be reviewed.

- (3) *Characteristic of fire.* This instruction should include trajectory, cone of fire, beaten zone, and center of impact, as outlined in paragraph 68, FM 23-57, and paragraph 5 of this manual.
- (4) *Field zeroing.* The gunner must now be taught to zero the weapon at long ranges (para 95).
- (5) *Range determination.* Gunners must be taught the importance of range determination and how to determine range by eye paragraph 70, FM 23-57.
- (6) *Adjusted aiming point method of fire adjustment.* This method should be thoroughly explained and demonstrated (para 96).

b. At the completion of the instruction the

entire unit is divided into equal groups. One group stays on the firing line and the others go to concurrent training stations.

- (1) *Concurrent training.* The county fair system of movement through concurrent training stations is recommended (fig. 101). Subjects covered in concurrent training stations should be limited to subjects relating to machinegunnery. The following are recommended subjects:

- (a) General disassembly and assembly and headspace of the caliber .30 machinegun.
- (b) Detailed disassembly and assembly of the caliber .30 machinegun.
- (c) Cycle of functioning of the caliber .30 machinegun to include stoppages and immediate action.
- (d) Direction and elevation readings. This instruction should include

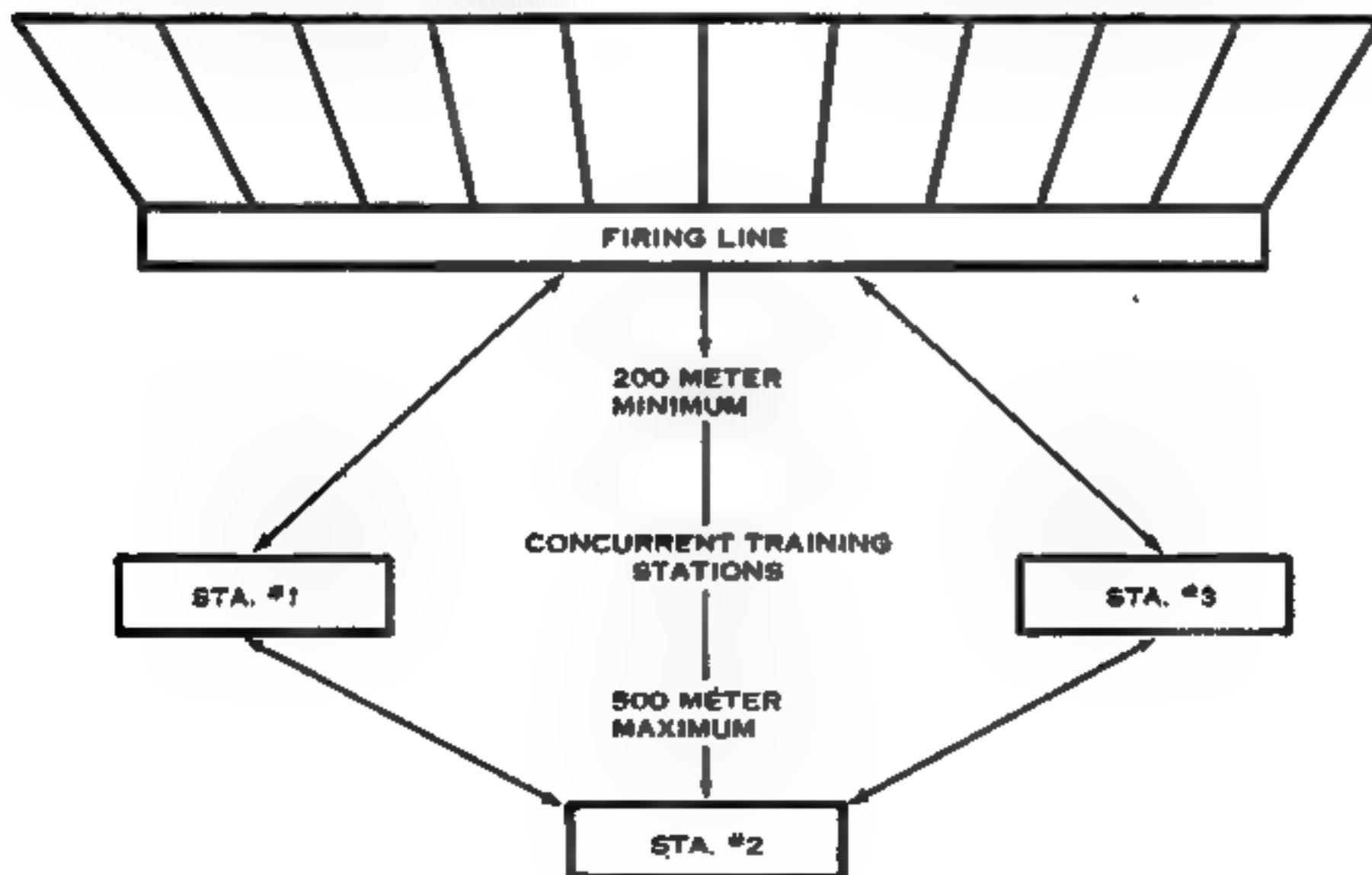


Figure 101. Range organization.

obtaining direction and elevation readings using the traversing bar and traversing and elevating mechanism method. This prepares the individual for subsequent range card instruction.

- (e) **Technique of fire rudiments.** This period of instruction should include a review of the characteristics of fire; an explanation of maximum ordinate; an explanation of classes of fire with respect to the ground, target, and gun; fire control; and a review of application of fire (ch 7, FM 23-67).

(2) **Firing line.**

- (a) Two gun positions are established in each lane and a 3-man crew consisting of a gunner, assistant gunner, and ammunition bearer is assigned to each gun. Each lane is controlled by a noncommissioned officer (NCO).
- (b) **Target control operators.** One target control operator is assigned to each lane and is responsible to raise and lower targets (as necessary) if the targets are electrically operated, or for telephonically instructing pit personnel when to raise and lower targets if the targets are manually operated. He is also responsible for indicating on each gunner's scorecard the targets which he hit. He makes entries in accordance with the instructions on the reverse side of the scorecard (DA Form 85).
- (c) **Safety regulations.** See appendix V, FM 23-67; and appendix VI, this manual.

c. A detailed list of the personnel, equipment, and training aids recommended to conduct transition instruction and concurrent training is contained in appendix IV, FM 23-67; and appendix IV, this manual.

99. Conduct of Firing

Gunners are required to fire the transition

course (table V, app II) twice, once for practice and once for record.

a. **Rules.** As each group reports to the firing line, the following rules are explained to them. These rules are predicated upon a transition course utilizing *double E-silhouette targets*. If *single E-silhouette targets*, are used, gunners should be allotted 180 rounds and a maximum of three bursts per target to compensate for the greater difficulty they will experience in engaging them. Also, when using single E-silhouettes, no minimum score is required to qualify in this phase of a gunner's qualification.

- (1) Each gunner is allotted 120 rounds and 4 minutes to engage the eight targets in his lane. He may fire a maximum of two bursts (any number of rounds is considered a burst) at each target, but he fires the second burst only if he fails to hit the target with his first burst.
- (2) Gunners will not fire on the same lane for record as they fired for practice.
- (3) The assistant gunner may assist the gunner in locating the targets as they appear, but may not assist the gunner in determining the ranges to them or in adjusting his fire.
- (4) Target number 1 (400 meters) is raised prior to the command to commence firing and is always the first target engaged.
- (5) Target number 8 (800 meters) must be the second, third, or fourth target which is raised.
- (6) The remaining six targets are raised in any sequence, but the target operators must have at least three different sequences for raising targets so the individual will not know which target to expect next.
- (7) If a stoppage occurs, the gunner must apply immediate action, and if the stoppage is reduced, continue to fire the course. The gunner may be allotted an additional 15 seconds for each application of immediate action.

If a stoppage occurs which cannot be reduced by immediate action, the gunner announces **TIME** and, with the assistance of the lane *NCO*, reduces the stoppages. When the gunner announces **TIME**, the lane *NCO* notes how many targets the gunner has not engaged, and after the stoppage has been reduced, insures that the gunner is allotted 30 seconds to engage each of the remaining targets.

- (8) To qualify, the gunner must engage all eight targets within the prescribed time limit.
- (9) A minimum score of 50 points (five hits) is required to receive a qualification.

b. Recommended Method of Firing the Course.

- (1) Each gunner zeroes his weapon prior to firing the course.
- (2) Within each lane, one gunner fires while the other gunner dry fires. Both gunners follow the same procedure. **THEY DETERMINE THE RANGE**

TO EACH TARGET AS IT APPEARS, PLACE THIS SETTING ON THEIR REAR SIGHT, ASSUME PROPER POSITION AND GRIP, OBTAIN CORRECT SIGHT ALIGNMENT AND SIGHT PICTURE, AND FIRE A 6- TO 9-ROUND BURST (DRY FIRE GUN SIMULATES).

- (3) If the gunner fails to hit the target with his initial burst, he must utilize the adjusted aiming point method of fire adjustment to attempt to hit the target with his next burst.

c. Scoring Procedures.

- (1) A gunner is credited with ten points for each target he hits and receives no credit for unexpended ammunition.
- (2) The scoring is done by the target control operator in each lane and is recorded in the place provided on the same scorecard (DA Form 85) which was used to record the gunner's score on the basic (10-meter) range.
- (3) All entries on the scorecard are made as shown in figure 98.

APPENDIX I

REFERENCES

AR 320-5	Dictionary of United States Army Terms.
AR 320-50	Authorized Abbreviations and Brevity Codes.
AR 370-5	Qualification and Familiarization.
AR 385-68	Regulations for Firing Ammunition for Training, Target Practice, and Combat.
ATP 7-18	Rifle Company, Infantry, Airborne and Mechanized Division; Infantry Battalions; Light Weapons Infantryman; Heavy Weapons Infantryman.
FM 7-11	Rifle Company, Infantry, Airborne, and Mechanized.
FM 7-16	Rifle Platoon and Squads Infantry, Airborne, and Mechanized.
FM 7-20	Infantry, Airborne Infantry, and Mechanized Infantry Battalions.
FM 21-5	Military Training Management.
FM 21-30	Military Symbols.
FM 21-40	Small Unit Procedures in Chemical, Biological and Radiological (CBR) Operations.
FM 21-60	Visual Signals.
FM 21-76	Combat Training of the Individual Soldier and Patrolling.
FM 23-5	U.S. Rifle, Caliber .30, M1.
FM 23-67	Machinegun 7.62-mm, M60.
FM 23-71	Rifle Marksmanship.
SM 9-5-1805	Group 18 Ammunition and Explosives.
TM 9-220	Chemical, Biological, and Radiological (CBR) Decontamination.
TM 9-207	Operation and Maintenance of Army Material in Extreme Cold Weather, 0 to -65°.
TM 9-575	Auxiliary Sighting and Fire Control Equipment.
TM 9-1805-200	Small-Arms Ammunition.
TM 9-2005	Caliber .30, Browning Machineguns, Water Cooled M1917A1; Fixed and Flexible M1919A4; Flexible M1919A4E1 and M1919A6; Fixed M1919A5; Aircraft Fixed and Flexible AN-M2; Caliber .30, Machinegun Tripod Mounts M1917A1 and M2, Weapon Tripod Mount M74.
TM 9-2012	Operation and Organizational Maintenance: Caliber .30 Machinegun M37 (Tank).
TM 9-2013	Ordnance Maintenance: Caliber .30 Machinegun M37 (Tank)
TM 9-6920-210-14	Operator, Organizational and Field Maintenance Manual Targets, Target Material, and Training Course Layouts.
DA Pam 108-1	Index of Army Motion Pictures, Film Strips, Slides, Tapes and Phono-Recordings.
DA Pam 310-3	Military Publications: Index of Doctrinal, Training, and Organizational Publications.
DA Pam 310-4	Military Publications: Index of Technical Manuals, Technical Bulletins, Supply Manuals (types 4, 6, 7, 8, and 9), Supply Catalogs (type CL), Supply Bulletins, Lubrication Orders, and Modification Work Orders.
DA Pam 310-5	Military Publications: Index of Graphic Training Aids and Devices.

APPENDIX II

AMMUNITION

1. General

a. This appendix describes the ammunition to be used for the caliber .30 machinegun and provides a recapitulation of ammunition requirements for the firing courses discussed in this manual. The members of machinegun crews must be able to recognize the types of ammunition available. They must also know how to care for ammunition.

b. Ammunition is issued in a metallic belt, 250 rounds per airtight metal container. It is issued as a complete round consisting of the projectile, the cartridge case, the propellant powder, and the primer.

2. Ammunition Data

a. *Classification.* Based upon the type of projectile, ammunition authorized for the caliber .30 machinegun is classified as follows:

- (1) Ball cartridge—for use against light material targets and personnel.
- *(2) Armor-piercing cartridge — for use against lightly armored targets where armor-piercing effects are desired.
- (3) Incendiary—for use against material targets where fire producing (incendiary) effects are desired.

*(4) Armor-piercing incendiary—for use when armor-piercing and incendiary effects are desired.

(5) Tracer cartridge—for observation of fire, incendiary effects, and signaling.

(6) Dummy cartridge — for use during training.

(7) Blank cartridge — for use during training when simulated live fire is desired.

b. Identification.

(1) The type, caliber, model, and ammunition lot number, including the symbol of the manufacturer, are necessary for complete identification of small arms ammunition. The caliber .30 cartridges are completely identifiable by their appearance, the painting of the projectile tips, the stamping of the manufacturer's initials and year of manufacture on the base of the cartridge cases, and the markings on the packing containers.

(2) When removed from their original packing containers, the cartridges may be identified by physical characteristics as follows (fig. 102):

Type	Distinguishing characteristics
Ball	None.
*Armor-Piercing (AP)	Tip of projectile is painted black for a distance of approximately 0.8 cm.
Incendiary	Tip of projectile is painted light blue for a distance of approximately 0.8 cm.
*Armor-piercing incendiary (API)	Tip of projectile is painted aluminum for a distance of approximately 0.8 cm.
Tracer (Tr)	Tip of projectile is painted red or orange for a distance of approximately 0.8 cm.
Dummy	Corrugated or three holes in body of cartridge case (no markings on projectile).
Blank	Metal jacket on narrow nose (metal jacket extends from the base of the cartridge to the end of the projectile).

*Not authorized for training.

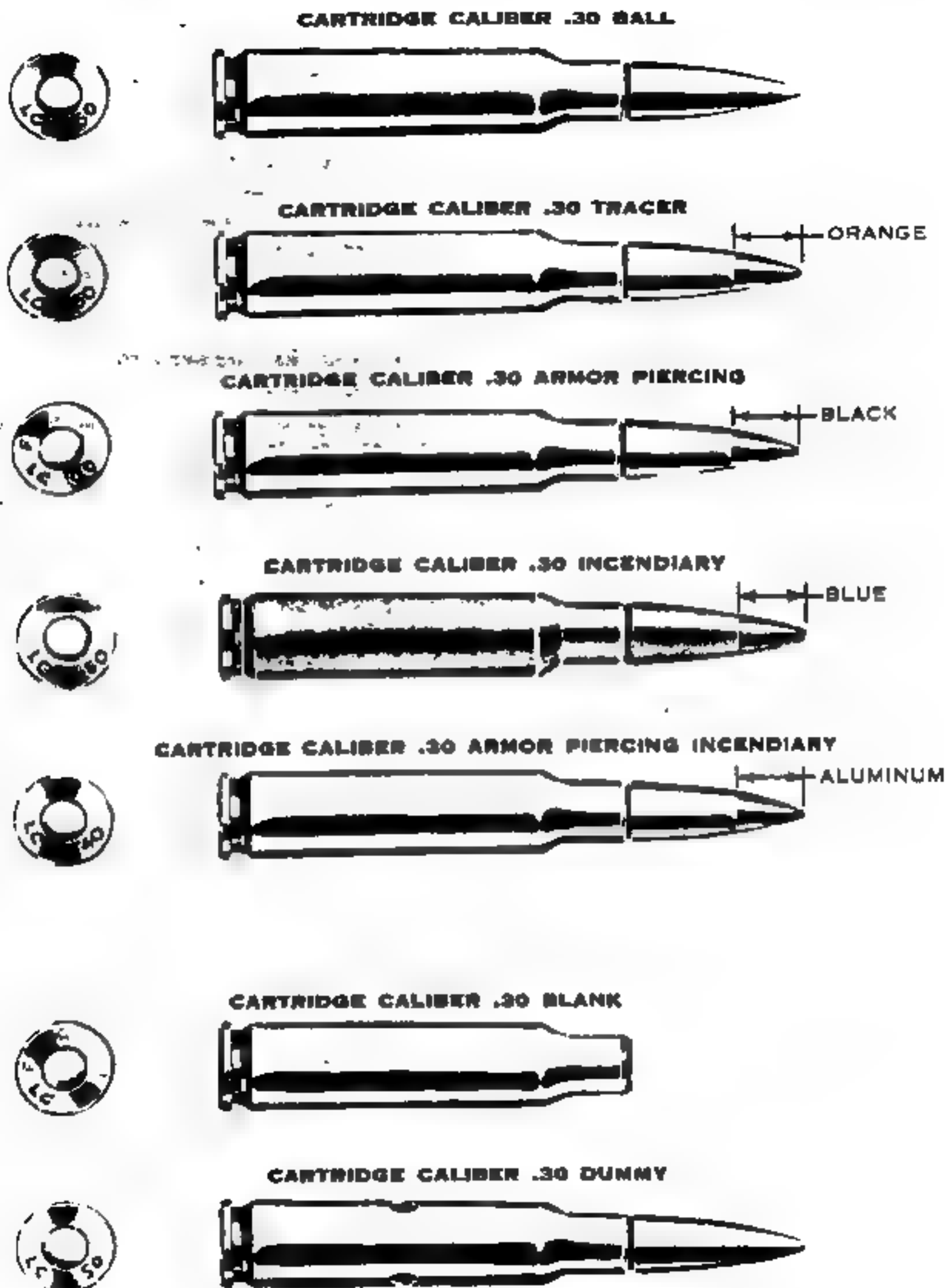


Figure 102. Ammunition characteristics.

c. *Storage.* Ammunition should be stored under cover. If it is necessary to leave ammunition in the open, keep it at least six inches (15 cm) from the ground and covered with a double thickness of tarpaulin. Place the cover so it gives maximum protection to the ammunition and allows free circulation of air. Dig suitable trenches to prevent water from flowing under the ammunition.

d. *Care, Handling, and Preservation.*

- (1) Ammunition containers should not be opened until the ammunition is to be used. Ammunition removed from the airtight containers, particularly in damp climates, is likely to corrode.
- (2) Protect ammunition from mud, dirt, and water. If the ammunition gets wet or dirty, wipe it off prior to use. Wipe off light corrosion as soon as it is discovered. Heavily corroded cartridges, or cartridges which have dented cases or loose projectiles, should not be fired.
- (3) Do not expose ammunition to the

direct rays of the sun. If the powder is hot, excessive pressure may be developed when the gun is fired.

- (4) Do not oil or grease ammunition. If it is oiled, dust and other abrasives will collect on it and damage the operating parts of the gun.

e. *Detailed Ammunition Information.* Complete data on caliber .50 ammunition for use in the caliber .50 machineguns is contained in TM 9-1305-200.

3. Ammunition Requirements for Machinegun Training

This appendix provides a recapitulation of ammunition requirements for machinegun training. Ammunition listed below is not to be considered as a mandatory requirement for the conduct of training, but is furnished as a guide to be used in conjunction with established allowances in TA 23-100. Unit commanders are responsible for insuring that ammunition expended does not exceed current authorized allowance in TA 23-100.

4. Marksmanship Courses

Table I. Basic (10-Meter) Marksmanship—Biped Firing

Time	Rounds per individual	Target	Type ammo	Type fire
No limit	6	Basic machinegun posters 1 and 2.	Ball	ZEROING (single rounds).
No limit	6	Basic machinegun poster 3.	Ball	FIXED (one burst).
No limit	6	Basic machinegun poster 4.	Ball	FIXED (one burst).
No limit	6	Basic machinegun poster 5.	Ball	FIXED (one burst).
No limit	6	Basic machinegun poster 6.	Ball	FIXED (one burst).
No limit	6	Basic machinegun poster 7.	Ball	FIXED (one burst).
No limit	6	Basic machinegun poster 8.	Ball	FIXED (one burst).
Total	48			

Table II. Basic (10-Meter) Marksmanship—Triped Firing, Practice

Time	Rounds per individual	Target	Type ammo	Type fire
No limit	6	Basic machinegun posters 1 and 2.	Ball	Zeroing (single rounds).
No limit	24	Basic machinegun posters 1, 2, 3, and 4.	Ball	Fixed (four bursts of 6 rounds each).
No limit	48	Basic machinegun exercises 1 to 3.	Ball	Traverse and search (6-round bursts each scoring space).
No limit	30	Basic machinegun exercises 4 to 6.	Ball	Traverse and search (6-round bursts each scoring space).
Total	108			

Table III. Basic (10-Meter) Marksmanship—Tripled Firing, Record Practice

Time (SEC)	Rounds per individual	Target	Type ammo	Type fire
50	48	Basic machinegun exercise 7 to 8.	Ball	Traverse and search (8-round bursts at each scoring space).
40	80	Basic machinegun exercise 6 to 5.	Ball	Traverse and search (8-round bursts at each scoring space).
Total	78			

Table IV. Basic (10-Meter) Marksmanship—Tripled Firing, Record

Time	Rounds per individual	Target	Type ammo	Type fire
No limit	8	Basic machinegun pattern 1 and 2.	Ball	Zeroing (single rounds).
No limit	24	Basic machinegun pattern 1, 2, 3, and 4.	Ball	Fixed (four bursts of 6 rounds each).
50	48	Basic machinegun exercise 7 to 8.	Ball	Traverse and search (8-round bursts at each scoring space).
40	80	Basic machinegun exercise 6 to 5.	Ball	Traverse and search (8-round bursts at each scoring space).
Total	108			

Table V. Basic Marksmanship Firing-Transition Range, Practice or Record

Range	Time (MIN)	Rounds per individual	Target	Type ammo	Type fire
400-700 meters	No limit	18	One double E-silhouette between 400 and 700 meters.	4-1	Zeroing (two or three 6- to 9-round bursts).
400-800 meters	4	180	Eight double E-silhouettes.	4-1	Fixed (a maximum of two bursts allowed at each target).
Total		276 (180 Prac.) (180 Rec.)			

Note. If single E-silhouette targets are used, the gunner should be allocated 180 rounds of 4-1 ammunition and a maximum of three bursts at each target for both practice and record firing.

Table VI. Day Defensive Field Firing

Range	Time	Rounds per individual	Target	Type ammo	Type fire
300-700 meters	No limit	20	E-type silhouette.	4-1	Zeroing (three 6- to 9-round bursts).
300-1100 meters	No limit	100	Linear, deep, or linear with depth.	4-1	6- to 9-round bursts (single gun).
300-1100 meters	No limit	80	Linear, deep, or linear with depth.	4-1	6- to 9-round bursts (guns employed in pairs).
Total		200			

Table VII. Predetermined Firing (Range Cards)

Time	Total rounds per two-man crew	Target	Type rounds	Type fire
Day Firing:				
No limit	20	Point.	Tracer	Zeroing (three 6- to 9-round bursts).
No limit	20	Final protective line.	Tracer	Obtain direction and elevation readings to final protective line.
No limit	20	Point.	Tracer	Obtain direction and elevation readings to point target.
No limit	20	Linear.	Tracer	Obtain direction and elevation readings to engage linear target.
No limit		Point.		Obtain direction and elevation readings by use of the "dry fire" method.
Night Firing:				
No limit	20	Point (dry fire).	Tracer	
No limit	40	Linear.	Tracer	Predetermined data.
No limit	20	Point.	Tracer	Predetermined data.
No limit	40	Final protective	Tracer	Predetermined data.
Total	100 per indiv. (200 per 2-man crew)			

Table VIII. Reconciliation of Ammunition for Tables I-VII

Table	Total rounds per individual	Type of ammunition
I	42	Ball
II	100	Ball
III	72	Ball
IV	111	Ball
V	276 (122 practice, 154 record)	4-1
VI	200	4-1
VII	100 (200 per 2-man crew)	Tracer
Total	912	

Table IX. Proficiency Field Course

Range	Period	Total rounds per individual	Type rounds	Type fire
Basic (10-meter).	I	100	Ball	Table IV.
Transition.	II	120	4-1	Table V.
Day defensive field firing.	III	200	4-1	Table VI.
Predetermined fire.	V	100 (200 per 2-man crew)	Tracer	Table VIII.
Day defensive field firing.	VI	100	Tracer	Engagement of point, linear, linear with depth, and deep targets during darkness using artificial illumination.
Total		640		

APPENDIX III

PROFICIENCY EXAMINATION AND PROFICIENCY FIELD COURSE

1. General

This appendix provides a guide for administering the proficiency examination to gunners and also provides a guide to unit commanders in the field for setting up a proficiency field course to maintain machinegunners' proficiency.

2. Proficiency Examination

a. The examination is a practical nonfiring exercise given during the last 4 hours of the machinegun block of instruction. It does not have to be conducted on a range, but may be held indoors if available facilities will permit.

b. To organize for training, the entire unit is assembled in one area and receives an initial orientation as follows:

DURING THE NEXT FOUR HOURS YOU WILL TAKE PART IN A PERFORMANCE TYPE EXAMINATION DESIGNED TO TEST YOUR KNOWLEDGE OF THE CALIBER .30 MACHINEGUN. STAY WITH YOUR ASSIGNED GROUP DURING THE ENTIRE EXAMINATION. INITIALLY, EACH GROUP WILL BE ASSIGNED TO A SPECIFIC STATION. AT EACH STATION AN ASSISTANT INSTRUCTOR WILL READ A STATEMENT EXPLAINING EXACTLY WHAT TASK OR TASKS YOU ARE TO PERFORM. AFTER BEGINNING WORK, IF YOU DO NOT KNOW A STEP OR STEPS, ASK THE ASSISTANT INSTRUCTOR FOR HELP. HE WILL TELL YOU HOW TO PERFORM THE STEP, DEDUCT THE NECESSARY POINTS FROM YOUR GRADE, AND YOU MAY CONTINUE WORK. SEVENTY PERCENT IS THE REQUIRED PASSING SCORE.

c. The units should be organized into six

equal groups which rotate from station to station until all individuals have been tested. Sufficient assistant instructors should be assigned to each station to grade and critique each gunner's performance. Up to 10 points can be awarded at each station for a total of 60. Forty-two points (70%) is required to pass the examination. Graders should give partial credit as appropriate. For ease in marking, scoresheets are given to each grader and collected immediately after the completion of the test.

d. The recommended time breakdown is as follows:

- (1) 15 minutes—orientation, instructions, breakdown, and movement.
- (2) 30 minutes each—six stations.
- (3) 10 minutes each—two breaks.
- (4) 5 minutes each — five movement periods.
- (5) 240 minutes—total time.

e. For a detailed list of personnel and equipment necessary to conduct this proficiency examination, see appendix IV, FM 23-87.

f. The six subjects and stations recommended for the proficiency examinations are as follows:

- (1) STATION: GENERAL DISASSEMBLY, ASSEMBLY, AND HEAD-SPACE

(a) This station consists of approximately 11 setups. Each setup consists of one tripod mounted caliber .30 machinegun with cover raised, bolt forward, and a combination wrench or dummy cartridge. This is placed on a mat to keep the parts free of dirt.

(b) The following statement should be read at this station:

DURING THIS PERIOD YOU WILL BE ORGANIZED INTO THREE GROUPS AND REQUIRED TO DISASSEMBLE AND ASSEMBLE THE CALIBER .30 MACHINEGUN AND SET HEADSPACE. EACH GROUP WILL BE ORGANIZED WITH ONE INDIVIDUAL PER GUN AND ONE GRADER PER TWO GUNS. EACH GROUP WILL BE ALLOWED EIGHT MINUTES TO COMPLETE GENERAL DISASSEMBLY, AS-

SEMBLY, AND HEADSPACE ADJUSTMENTS. IF YOU HAVE ANY TROUBLE, RAISE YOUR HAND, AND THE GRADER WILL ASSIST YOU. THE TWO GROUPS NOT BEING TESTED WILL REMAIN TO THE REAR OF THE STATION WITH THEIR BACKS TOWARD THE WORKING AREA UNTIL THEY ARE CALLED.

- (c) The following scoresheet should be used in grading individual performance:

STATION 1

GENERAL DISASSEMBLY, ASSEMBLY, AND HEADSPACE

Checklist	Point value	Name
1. Remove backplate group.	1	
2. Remove the bolt group.	1	
3. Remove the lock frame group.	1	
4. Remove and separate barrel and barrel extension.	1	
5. Connect and replace barrel and barrel extension.	1	
6. Replace lock frame group.	1	
7. Replace the bolt group.	1	
8. Replace the backplate group.	1	
9. Set correct headspace.	2	
Total Score	10	

- (d) At the completion of testing for each group, each grader should assemble the individuals he graded and give them a thorough critique (6 minutes).

(2) STATION 2: DETAILED DISASSEMBLY AND ASSEMBLY.

- (a) This station consists of approximately 11 setups. Each setup consists of a caliber .30 machinegun disassembled into its major groups. Mats should be provided to avoid losing small parts and getting dirt into the weapon.
- (b) The following statement should be read at this station:

DURING THIS PERIOD YOU WILL BE ORGANIZED INTO THREE GROUPS AND BE REQUIRED TO PERFORM DE-

TAILED DISASSEMBLY AND ASSEMBLY OF THE CALIBER .30 MACHINEGUN. EACH GROUP WILL BE ORGANIZED WITH ONE INDIVIDUAL PER GUN AND ONE GRADER PER TWO GUNS. EACH GROUP WILL BE ALLOWED EIGHT MINUTES TO COMPLETE THE TASK. IF YOU HAVE ANY TROUBLE, RAISE YOUR HAND, AND THE GRADER WILL ASSIST YOU. THE TWO GROUPS NOT BEING TESTED WILL REMAIN TO THE REAR OF THE STATION WITH THEIR BACKS TOWARD THE WORK AREA UNTIL THEY ARE CALLED.

- (c) The following scoresheets should be used in grading individual performance:

STATION 2
DETAILED DISASSEMBLY AND ASSEMBLY

Checklist	Point value	Names
1. Disassembly and assembly of barrel extension.	2	
2. Disassembly and assembly of bolt group.	4	
3. Disassembly and assembly of cover group.	2	
4. Disassembly and assembly of lock frame group.	2	
Total Score	10	

(d) At the completion of testing for each group, each grader should assemble the individuals he graded and give them a thorough critique (6 minutes).

(2) STATION 3: PLACING CORRECT READINGS ON THE TRAVERSING AND ELEVATING MECHANISM

(a) This station consists of approximately 11 setups. Each setup consists of the following: one tripod mounted machinegun complete with traversing and elevating mechanism.

(b) For the first direction reading, the grader should insure that the traversing bar slide will be on an even 5-mil graduation on the traversing bar and require the individual to place one to four mils on the traversing handwheel; i.e., L342. This will require that he recenter the traversing mechanism before he can place the next direction reading on it correctly. The second direction reading should be in the opposite direction; i.e., R240. The second elevation reading should also be a

major change; e.g., +50/82 to -50/17.

(c) The following statement should be read at this station:

DURING THIS PERIOD YOU WILL BE ORGANIZED INTO THREE GROUPS AND BE REQUIRED TO PLACE TWO SETS OF READINGS ON THE TRIPOD MOUNTED CALIBER .50 MACHINEGUN. A GRADER WILL CHECK YOUR FIRST SET OF READINGS BEFORE YOU PLACE THE SECOND SET ON THE GUN. YOU WILL BE ALLOCATED AN EIGHT MINUTE WORK PERIOD AT THIS STATION. IF YOU HAVE ANY TROUBLE, RAISE YOUR HAND, AND THE GRADER WILL ASSIST YOU. THE TWO GROUPS NOT BEING TESTED WILL REMAIN TO THE REAR OF THE STATION WITH THEIR BACKS TOWARD THE WORK AREA UNTIL THEY ARE CALLED.

(d) The following scoresheet should be used in grading individual performance.

STATION 3
PLACING CORRECT READINGS ON TRAVERSING AND ELEVATING MECHANISM

Checklist	Point value	Names
First Set of Readings:		
1. Correct direction reading.	2	
2. Correct elevation reading.	2	
3. Recenter traversing handwheel.	2	
Second Set of Readings:		
4. Correct direction reading.	2	
5. Correct elevation reading.	2	
Total Score	10	

- (e) At the completion of testing for each group, each grader should assemble the individuals he graded and give them a thorough critique (6 minutes).

(4) STATION 4: IMMEDIATE ACTION.

- (a) This station consists of approximately six setups. Each setup should consist of a bipod mounted caliber .30 machinegun.
- (b) The grader will ask the individual to perform immediate action as he would initially, and subsequently, if the bolt handle did or did not go fully forward when the weapon was ~~reloaded~~.
- (c) The following statement should be read at this station:

DURING THIS PERIOD YOU WILL BE ORGANIZED INTO FIVE GROUPS AND REQUIRED TO GO THROUGH THE STEPS OF IMMEDIATE ACTION WITH THE CALIBER .30 MACHINEGUN. YOU WILL BE ALLOWED FIVE MINUTES. IF YOU HAVE ANY TROUBLE, RAISE YOUR HAND, AND A GRADER WILL ASSIST YOU. THE GROUPS NOT BEING TESTED WILL REMAIN TO THE REAR OF THE STATION WITH THEIR BACKS TOWARD THE WORK AREA UNTIL THEY ARE CALLED.

- (d) The following scoresheets should be used in grading individual perform-

**STATION 4
IMMEDIATE ACTION**

Checklist	Point value	Notes
1. Pull the bolt to the rear, release it, re-lay and attempt to fire.	2	
2. Since the gun fails to fire, the students note the position of the bolt handle and act accordingly—		
a. Go through the subsequent actions with the bolt fully forward.	4	
b. Explain the actions that would be used if bolt did not return to its fully forward position.	4	
Total Score	10	

- (e) At the completion of testing for each group, each grader should assemble the individuals he graded and give them a thorough critique (5 minutes).

(5) STATION 5: LONG-RANGE ZEROING.

- (a) This station consists of approximately six setups. Each setup consists of a bipod mounted machine-
~~gun~~
- (b) Each grader should tell the individual the range (600 meters) to the target and have him simulate the firing of a 6- to 9-round burst. The grader will then tell the individual that corrections for deflection and

elevation are needed to hit the target. The gunner will then be graded on what actions he would take.

- (c) The following statement should be read at this station:

DURING THIS PERIOD YOU WILL BE ORGANIZED INTO FIVE GROUPS AND REQUIRED TO GO THROUGH AND EXPLAIN THE STEPS OF ZEROING THE CALIBER .30 MACHINEGUN AT LONG RANGES. YOU WILL BE ALLOWED FIVE MINUTES TO EXPLAIN AND PERFORM YOUR ACTIONS TO THE GRADER. IF YOU HAVE ANY PROBLEM, ASK YOUR

GRADER. THE GROUPS NOT BEING TESTED WILL REMAIN TO THE REAR OF THE STATION WITH THEIR BACKS TO-

WARD THE WORK AREA UNTIL THEY ARE CALLED.

- (d) The following scoresheet should be used in grading individual performance:

STATION 5
LONG-RANGE TRAINING

Checklist	Point value	Names
1. Place original range setting of 600 meters on the sight and set the windage gauge at zero.	5	
2. Explain how to correct for deflection.	5	
3. Explain how to correct for elevation.	5	
4. Record deflection zero.	1	
Total Score	16	

- (e) At the completion of testing for each group, each grader, should assemble the individuals he graded and give them a thorough critique (5 minutes).

(6) STATION 6: ENGAGEMENT OF A LINEAR AND A DEEP TARGET.

- (a) This station consists of approximately six setups. Each setup should have a punchboard type training aid (fig. 161, FM 23-67) or a chalkboard and chalk.
- (b) The individual is required to show his point of initial lay, direction of manipulation, and extent of manipulation for a linear (single gun) and a deep target (guns employed in pairs). The individual is also asked what rate of fire he would use if rate were not stated in the fire command to engage these targets.
- (c) The following statement should be read at this station:

DURING THIS PERIOD YOU WILL BE ORGANIZED INTO FIVE GROUPS AND REQUIRED TO EXPLAIN HOW TO ENGAGE DIFFERENT TARGETS WITH THE MACHINEGUN EMPLOYED SINGLY AND IN PAIRS. YOU WILL BE ALLOWED FIVE MINUTES FOR SIMULATED ENGAGEMENT OF TWO TYPES OF TARGETS. IF YOU HAVE ANY QUESTIONS, ASK YOUR GRADER. THE GROUPS NOT BEING TESTED WILL REMAIN TO THE REAR OF THE STATION WITH THEIR BACKS TOWARD THE WORK AREA UNTIL THEY ARE CALLED.

- (d) The following scoresheet should be used in grading individual performance:

STATION 6
ENGAGEMENT OF A LINEAR AND A DEEP TARGET

Checklist	Point value	Names
1. Linear (single gun):		
a. Initial lay.	1	
b. Proper manipulation.	1	
2. Deep (gun employed in pairs):		
a. Initial lay.	2	
b. Proper manipulation.	2	
3. Use of rapid rate of fire.	1	
Total Score	10	

- (e) At the completion of testing for each group, each grader should assemble the individuals he graded and give them a thorough critique (5 minutes).

3. Proficiency Field Course

This is a suggested course designed to maintain the proficiency of machinegunners. It consists of five periods of instruction (17 hours) which review important aspects of machinegunnery. It is conducted during unit training at the discretion of the unit commander.

a. Period I.

- (1) Subject: Basic (10-meter) tripod instructional firing.
- (2) Time allocation: 3 hours.
 - (a) Review: 40 minutes.
 - (b) Practical work: 140 minutes.
- (3) Scope: Review and practical exercises covering emplacing, sighting and aiming, position and grip, zeroing, manipulation, loading and unloading, immediate action, and instructional firing with the tripod mounted caliber .80 machinegun (ch 8).
- (4) Training facility: Basic (10-meter) range (ch 8).
- (5) Ammunition allocation: (table IX, app II).

b. Period II.

- (1) Subject: Transition instructional firing.
- (2) Time allocation: 3 hours.
 - (a) Review: 40 minutes.
 - (b) Practical work: 140 minutes.
- (3) Scope: Review and practical exercise covering engagement of long-range point targets, crew training, and instructional firing (ch 8).
- (4) Training facility: Transition range (ch 8).
- (5) Ammunition allocation: (table IX, app II).

c. Period III.

- (1) Subject: Technique of fire (direct lay).
- (2) Time allocation: 3 hours.
 - (a) Review: 40 minutes.
 - (b) Practical work: 140 minutes.
- (3) Scope: Review and practical exercise covering characteristics of fire, fire control, and engagement of field-type targets (ch 11, FM 23-67).
- (4) Training facility: Day defensive range (ch 11, FM 23-67).
- (5) Ammunition allocation: (table IX, app. II).

d. Period IV

- (1) Subject: Predetermined fire role.
- (2) Time allocation: 4 hours.
 - (a) Review: 60 minutes.
 - (b) Practical work: 180 minutes.
- (3) Scope: Review and practical exercise covering sectors of fire, final protective lines, sectors of graze, principal directions of fire, direction and elevation readings, preparation of a range card, night firing methods, and firing to include preparation (during daylight) and use (during darkness) of a range card (ch 3, FM 23-67).
- (4) Training facility: Predetermined fire range (ch 11, FM 23-67).
- (5) Ammunition allocation: (table IX, app. II).

e. Period V.

- (1) Subject: Technique of fire during periods of limited visibility (darkness) using battlefield illumination.
- (2) Time allocation: 4 hours.
 - (a) Review: 60 minutes.
 - (b) Practical work: 180 minutes.
- (3) Scope: Review and practical exercise covering the techniques involved in placing effective fire on targets during periods of darkness using battlefield illumination (ch 11, FM 23-67).
- (4) Training facility: Day defensive range (ch 11, FM 23-67).
- (5) Ammunition allocation: (table IX, app. II).

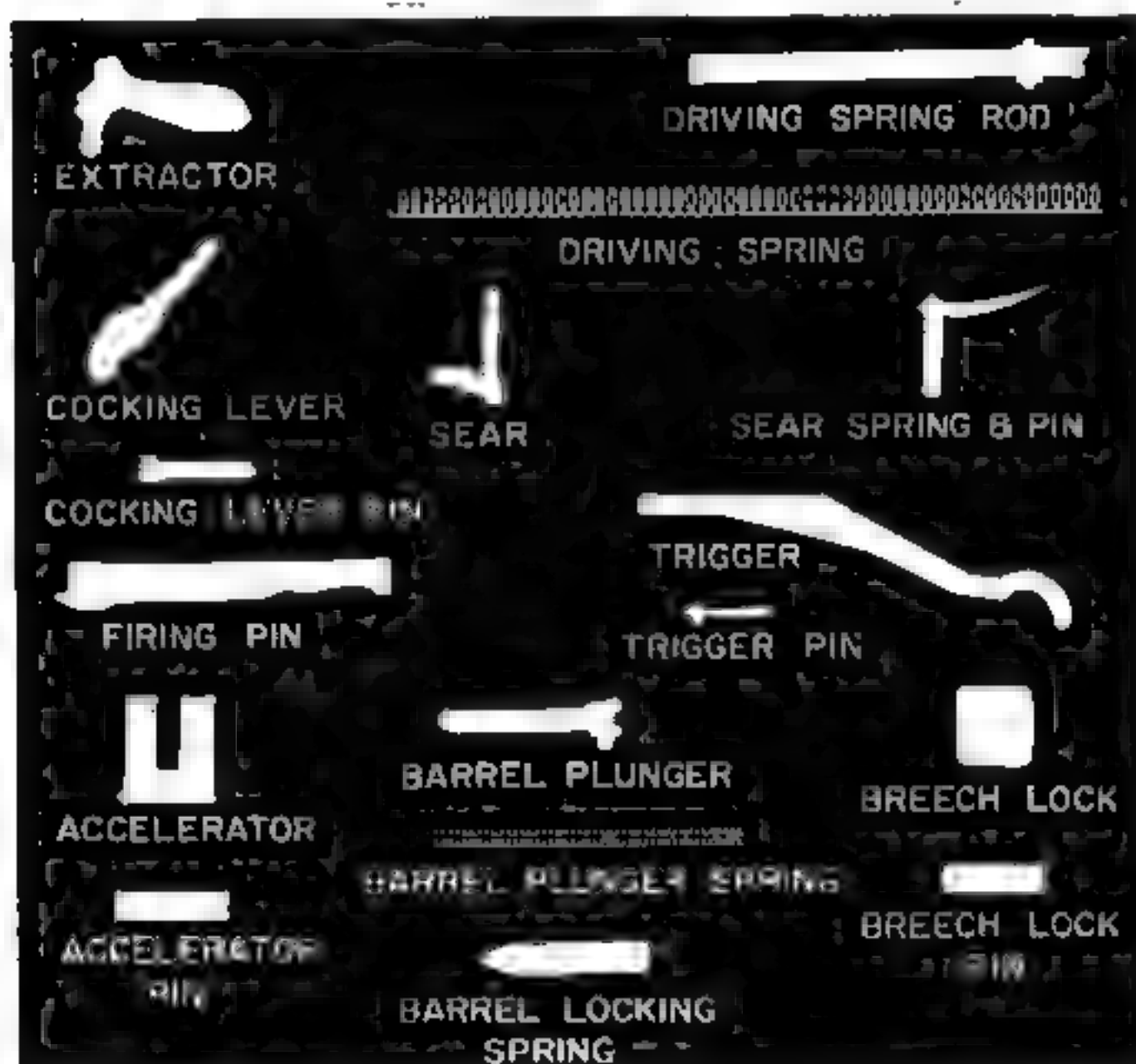
APPENDIX IV

TRAINING AIDS AND DEVICES

1. General

This appendix is designed to aid the instructor in conducting the training outlined in this

manual (marksmanship, field target firing, proficiency examination, and field proficiency course). The recommended personnel, equip-



Front

Figure 103. Nomenclature board.

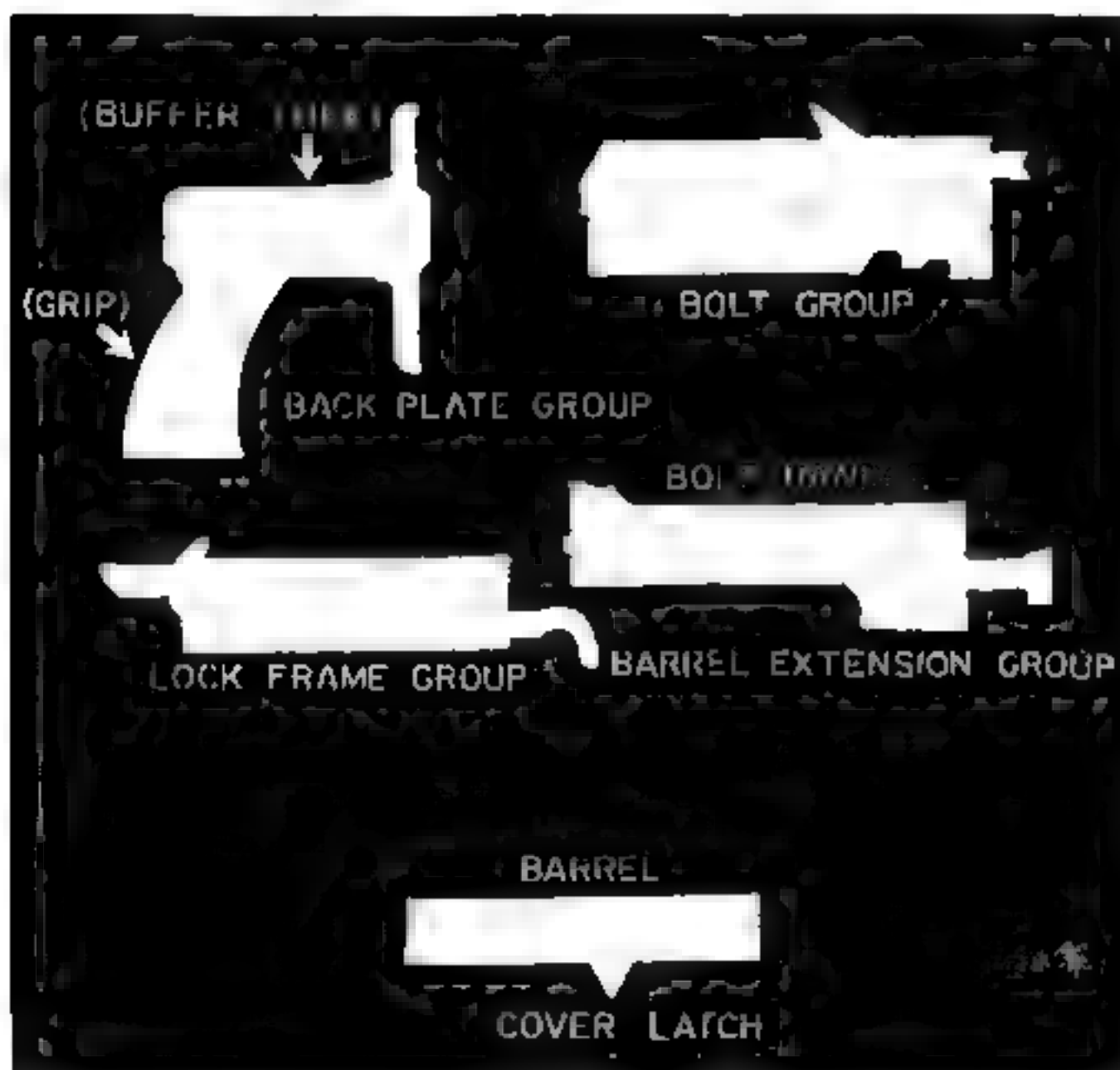
ment, training aids and devices are based upon a unit of 200 men and optimum conditions. (If necessary, training can be conducted with less.) As the size of the unit varies, compensation in the amounts of required personnel and equipment should be made accordingly.

2. Personnel, Training Aids, and Devices

The recommended personnel, equipment,

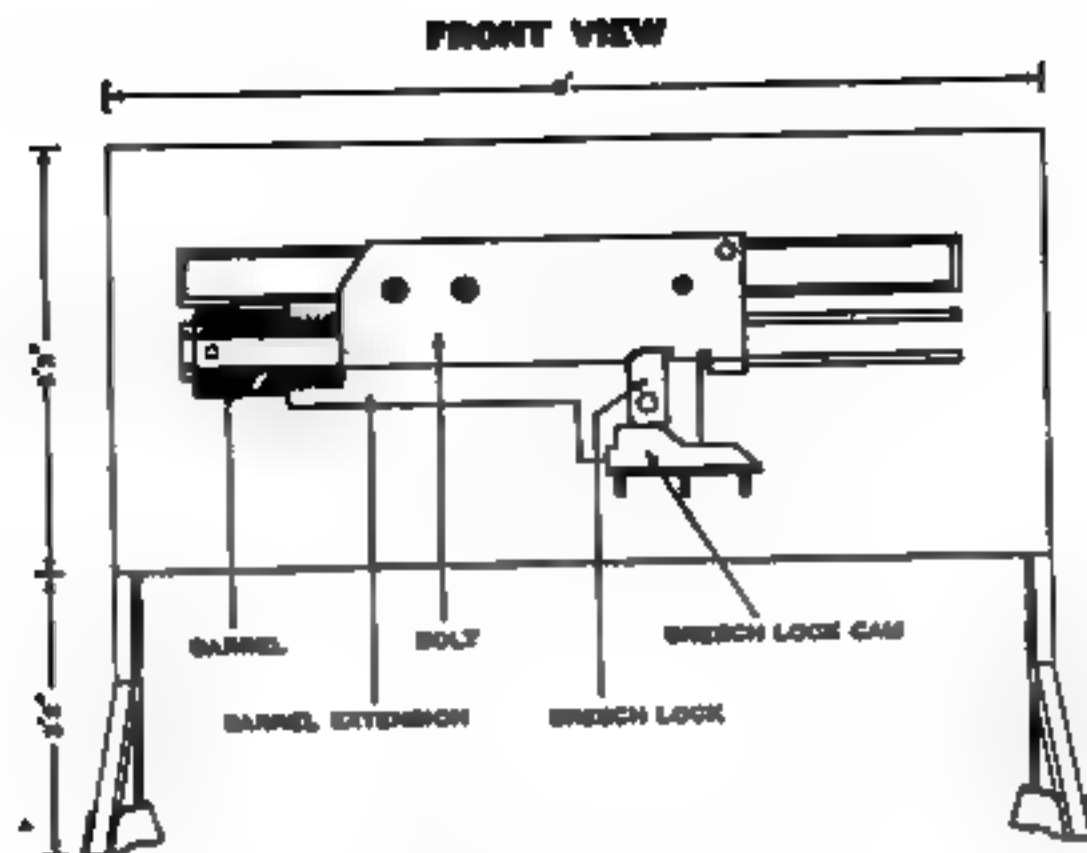
training aids and devices described in appendix IV, FM 23-67, apply to the caliber .30 machineguns with the exceptions described in a through c below.

a. In the following figures, delete all references to the M60 machinegun and 7.62-mm ammunition and substitute caliber .30 machinegun and caliber .30 ammunition:

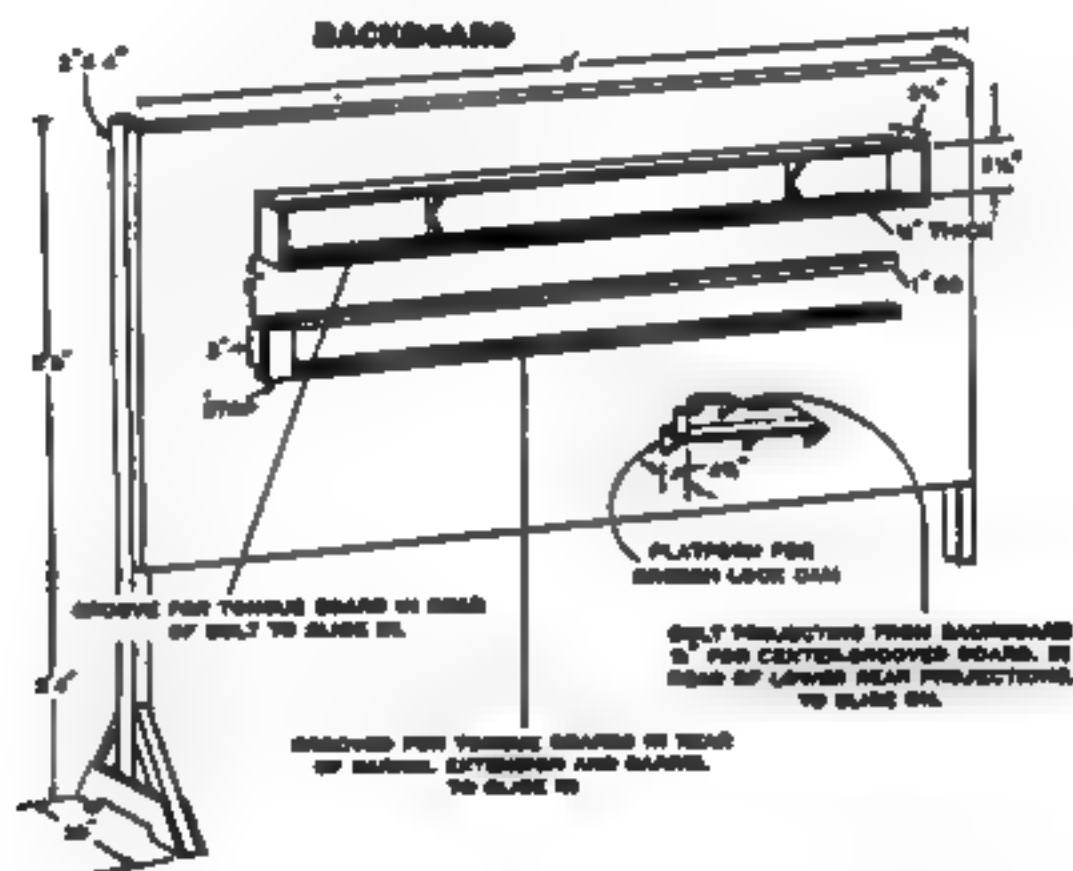


Back

Figure 103—Continued.



1. Wooden working model of recoiling parts to demonstrate headspace adjustment, locking, and unlocking of the breech



2. Construction of the backboard for recoiling parts

Figure 104. Working model for headspace adjustment.

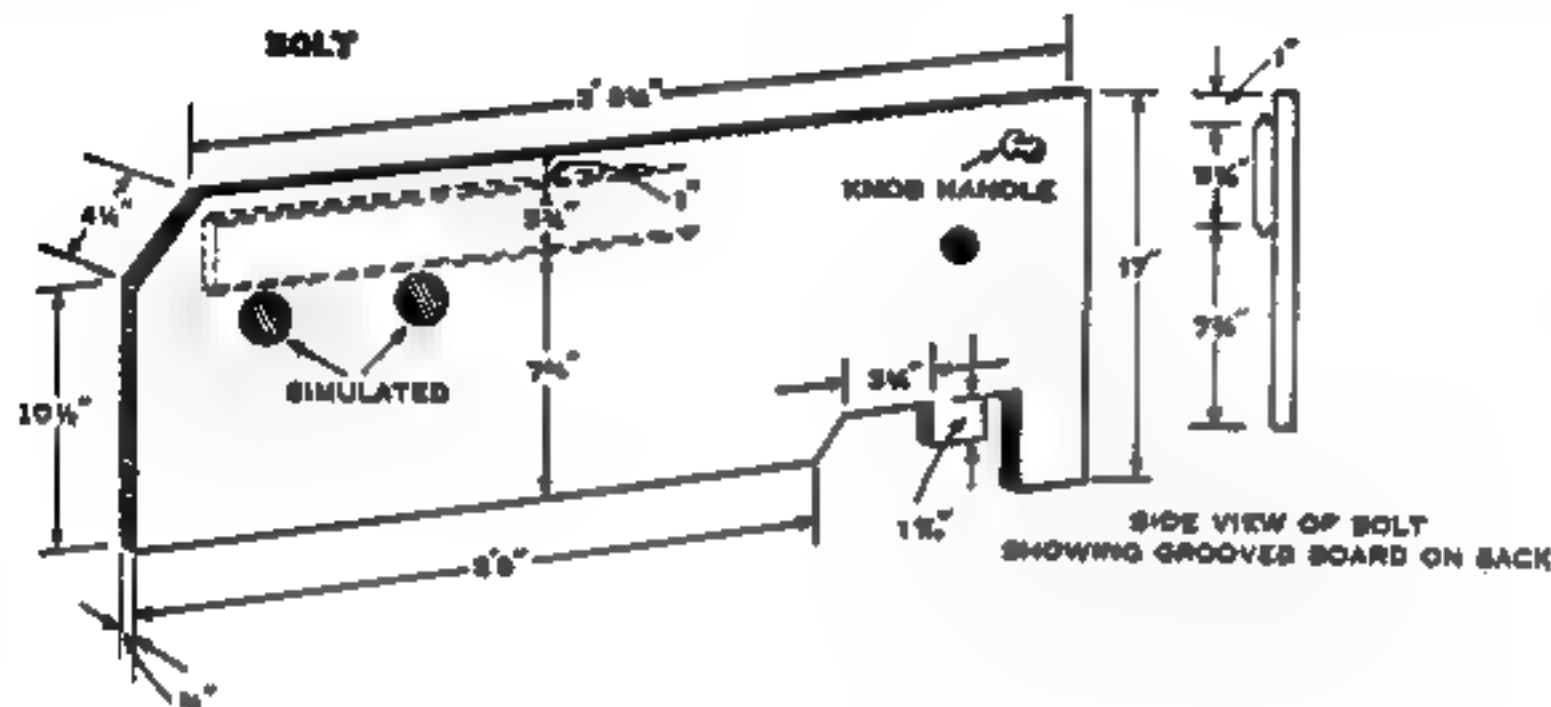
- (1) Figure 149, M60 zeroing.
- (2) Figure 153, beaten zone.
- (3) Figure 157, maximum ordinates.

- (4) Figure 158, plunging and grazing fire.
 - (5) Figure 165, grazing fire.
- b. Delete the following training aids:

- (1) Figure 144, nomenclature board, M60.
- (2) Figure 145, dummy ammunition spacing.
- (3) Figure 150, brass deflectors.
- (4) Figure 163, basic functioning chart.
- (5) Figure 167, sight picture, aiming stake method chart.

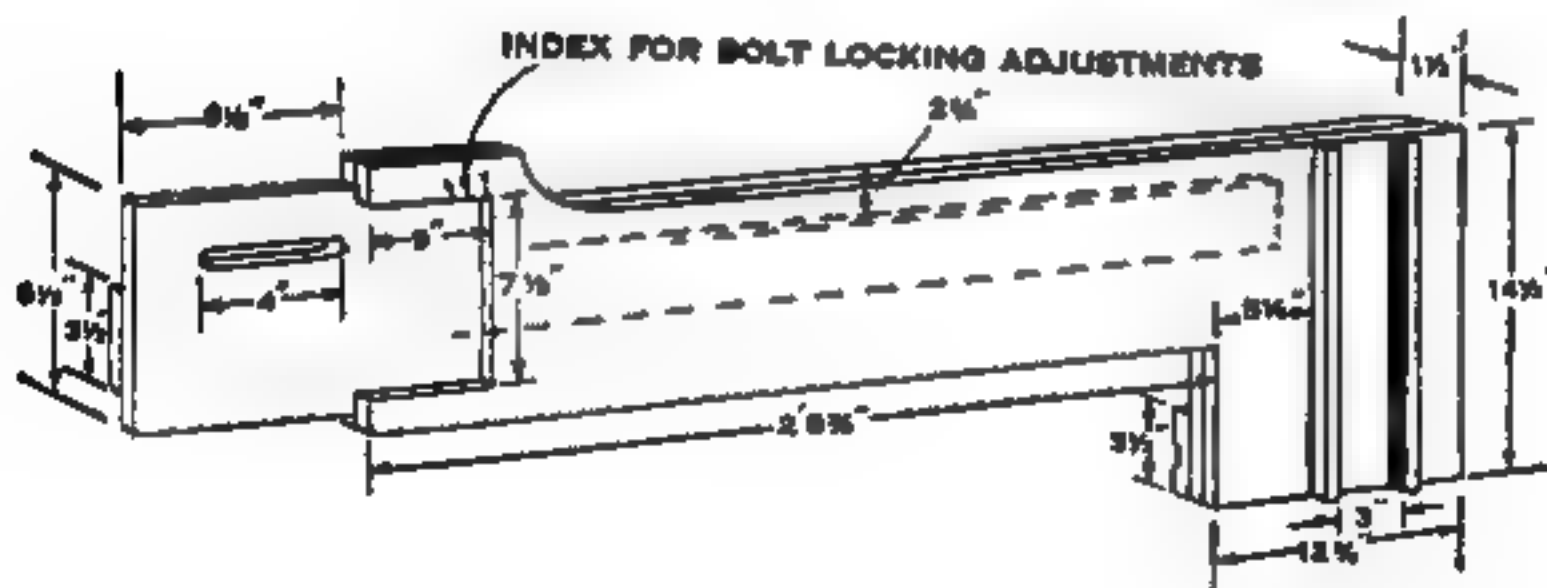
c. Add the following training aids:

- (1) Figure 103, nomenclature board (for general and detailed disassembly and assembly).
- (2) Figure 104, working model for head-space adjustment.



B. Construction of the Index

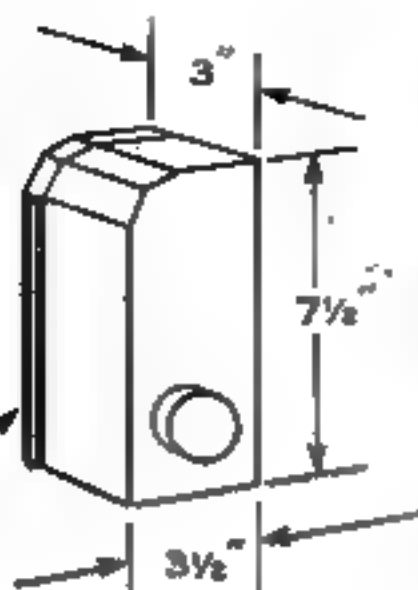
PARALLEL EXTENSION



4. Construction of the barrel extension

Figure 16—Continued.

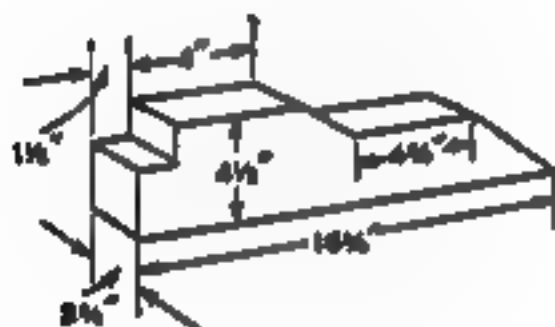
BREECH LOCK



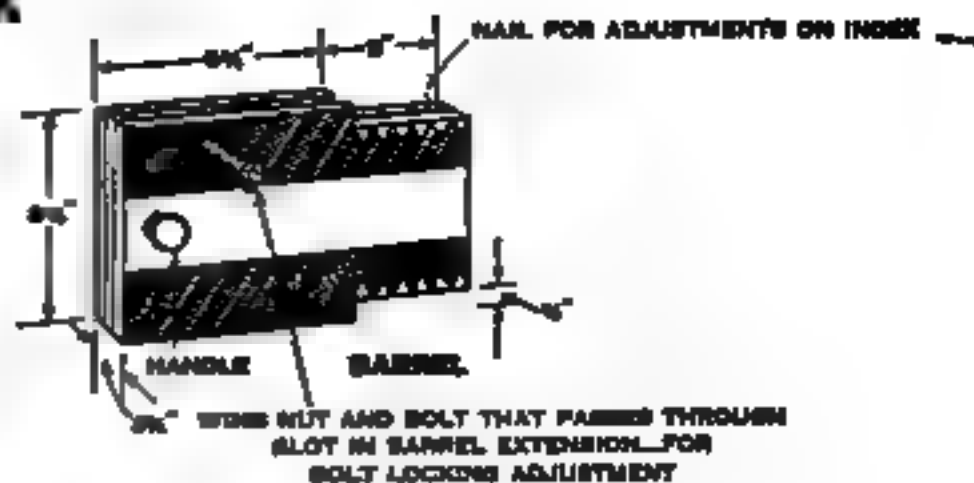
BOARD WITH PROJECTIONS TO
RIDE IN GROOVES AT REAR OF
BARREL EXTENSION

5. Construction of the breech lock

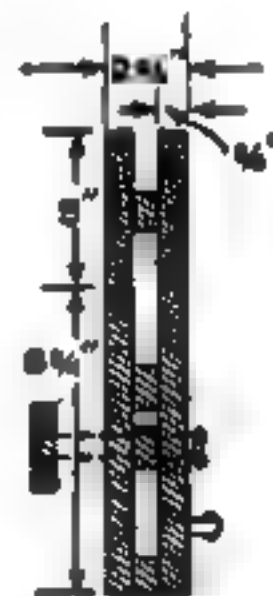
BREECH LOCK CAM



6. Construction of the breech lock cam



7. Construction of the barrel (side view)



TOP VIEW OF BARREL

8. Construction of the barrel (top view)

Figure 104—Continued.

APPENDIX V

OVERHEAD FIRE

1. General

The information and techniques described in paragraphs 95 through 98, FM 23-67, apply to the caliber .80 machineguns with the exceptions described in the paragraphs below.

2. Overhead Fire

Overhead fire may be delivered on targets at ranges greater than 850 meters from the gun and, in certain instances, over level or uniformly sloping terrain.

3. Gunner's Rule

The gunner's rule (fig. 105) for determining the *safety limit* differs from that used with the M60 machinegun. It is used only when the range to the target is 900 yards or less. It is applied by the gunner unless the *safety limit* has been determined and announced by the leader. The rule is as follows:

a. Lay the gun on the target with the correct sight setting to hit the target.

b. Without disturbing the lay of the gun, set the rear sight at 1,500 yards.

c. Look through the rear sight and note the point where the new line of aim strikes the ground. An imaginary line drawn through this point and parallel to the target is the *safety limit*.

4. Leader's Rule

The leader's rule (fig. 106) is used by the leader when the range to the target is greater than 900 yards. The rule is as follows:

a. Select a point on the ground to which it is believed that friendly troops can advance with safety.

b. Determine the range to this point.

c. Lay the gun on the target with the correct sight setting to hit the target.

d. Without disturbing the lay of the gun, set the rear sight at 1,500 yards, or the range to the selected point plus 600 yards, whichever is greater. Under no conditions should the sight setting be less than 1,500 yards.

e. Note the point where the new line of aim strikes the ground.

(1) If it strikes at the selected point, that point marks the *safety limit*.

(2) If it strikes short of the selected point, it is safe for the troops to advance to where the new line of aim strikes the ground, and an unknown distance beyond. If it is desired to fire after the troops advance farther than where the new line of aim strikes the ground, this farther distance must be determined by testing new selected points until the new line of aim and the selected distance coincide.

(3) If it clears the selected point, it is safe for the troops to advance to the selected point, and an unknown dis-



Figure 105. Application of the gunner's rule.

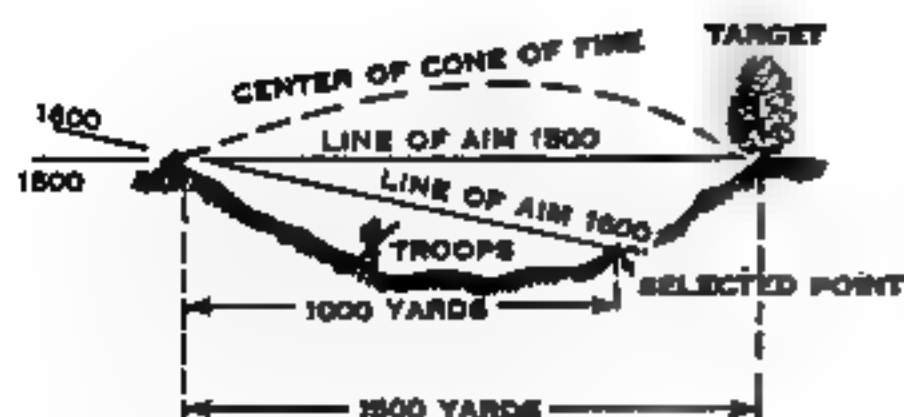


Figure 106. Application of the leader's rule.

tance beyond. If it is desired to have troops advance beyond this selected point, this farther distance must be determined by testing new selected points until the line of aim and the selected distance coincide. This point marks the safety limit.

5. Safety Precautions

The following safety precautions must be considered when delivering overhead fire:

a. If safety has been checked only by application of the leader's or gunner's rule, do not deliver overhead fire if troops are less than 400 or more than 1,800 yards from the gun, unless safety is obvious.

b. Do not use tracer ammunition in overhead fire as its trajectory beyond 750 yards is unpredictable.

c. When it is noticed that a barrel is losing its accuracy due to an excessive number of rounds fired, do not use it for overhead fire.

d. Cool any barrel which has fired 750 consecutive rounds or change the barrel before delivering overhead fire.

e. Firmly emplace the tripod mount.

f. Use depression stops to prevent the muzzle of the gun from being accidentally lowered below the safety limit.

g. Do not deliver overhead fire through trees.

h. Inform the commanders of the friendly troops when fire is to be delivered over their heads.

i. Insure that all members of the gun crew are aware of the safety limit.

j. During training exercises—

- (1) Do not lay machineguns so their fire will cross at any point over the heads of friendly troops.
- (2) Consult AR 385-63 and local safety regulations concerning overhead fire.

APPENDIX VI

SAFETY

1. General

This appendix covers the safety precautions used to insure safe conditions on the ranges described in this manual. These safety precautions will assist the instructor in meeting the safety requirements for conduct of the training. They are intended as a guide only and must be used in conjunction with Army and local regulations.

2. Safety Precautions

The information and techniques described in paragraphs 1 through 6, appendix V, FM 23-67, apply to the caliber .30 machineguns with the exceptions described in a through e below.

a. All caliber .30 machineguns will be kept in a prescribed area with the bolt to the rear when not in use. A wooden block, which extends above and below the receiver approximately one inch, will be inserted in the receiver between the bolt and the rear of the barrel.

b. For the procedures involved in handling a runaway gun, see paragraph 39b.

c. The procedure for clearing the Browning machinegun, caliber .30 is as follows:

- (1) The gunner raises the cover, locks the bolt to the rear, and inspects the chamber and T-slot; if they are clear, he declares CLEAR.
- (2) At this time, an assistant instructor runs a cleaning rod through the barrel until he sees the end of it in the receiver.
- (3) The assistant instructor then inspects the receiver for rounds or links.
- (4) If the weapon is clear, the cleaning rod is removed from the bore and a wooden block is inserted in the receiver as described in a above.

d. Caution must be taken to insure that assistant gunners do not have their heads forward of the carrying handle during firing. This is necessary to prevent the muzzle blast of the weapon injuring the assistant gunner.

e. Appendix V, FM 23-67, prescribes safety precautions to be taken during assault firing, however assault firing instruction is not conducted with the Browning machinegun, caliber .30.

APPENDIX VII

ACCESSORIES AND TOOLS

1. Short-Round Stop

The purpose of the short-round stop (fig. 107) is to provide an assured means of eliminating stoppages caused by metal links jamming in the feedway exit and stoppages caused by short rounds. It is installed on the front cartridge stop of the M1919A6 machinegun.

2. Carrying Handle

The carrying handle is used for carrying the M1919A6 machinegun in the field. It is especially useful when the barrel is hot. The handle has a clamp for attachment to the gun, a hinged body, and a wooden hand grip. It can be rotated to the right or left to clear the line of sight.

3. Blank Firing Attachment

a. The blank firing attachment (fig. 108) is used to adapt the gun for firing blank ammunition.

- (1) *Blank firing cartridge-stop attachment.* Insert the cartridge-stop attachment by withdrawing the belt holding pawl split pin about one-half of an inch; then slide the attachment over the cartridge stop, line up the small hole with the belt holding pawl split pin, and replace the pin. The cartridge-stop attachment acts as a guide and also as a stop for the blank cartridge. Its principal use is to hold the cartridge in position in the feedway so that the extractor may engage the rim of the cartridge; it also prevents the entrance of a live round into the feedway.

- (2) *Blank firing muzzle attachment for*

machinegun, M1919A6. Assemble this attachment to the gun by first removing the front barrel bearing; then slide the threaded end of the attachment over the barrel and screw it into the barrel jacket.

b. Precautions.

- (1) *Never* use the muzzle attachment unless the cartridge-stop attachment is in its proper place in the feedway.
- (2) *Always* remove the muzzle attachment before removing the cartridge-stop attachment to eliminate the possibility of firing live ammunition with the muzzle attachment still in position.
- (3) *Before* firing, see that the hole in the muzzle attachment is clear.
- (4) *After* firing blank ammunition, clean the barrel. *This must be done before firing any other type of ammunition.*



Figure 107. Short-round stop, caliber .30 machineguns.

4. Combination Wrench, M6

The combination wrench M6, is composed of

three parts: the body, punch, and rivet. It has many uses which are indicated in figure 109.



Figure 108. Blank firing attachment.



Figure 109. Combination wrench M6.

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Biped mounted gun	75	75	Tripod mounted gun	86	80
Tripod mounted gun	87	80	Trigger manipulation	72	72
Overhead fire	app V	110	Tripod mount, M2	2	2
Position and grip:			Unlocking	35	41
Biped mounted gun	73	72	Vehicular mounts	25	26
Tripod mounted gun	85	79	Water for bore cleaning	44	47
			Zeroing	72	72